

GREEN AUDIT REPORT

2018-2019



VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY

ODISHA, BURLA-768018

INDIA



Vice-Chancellor

Veer Surendra Sai University of Technology, Burla

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From the Desk of Chairperson, IQAC

Veer Surendra Sai University of Technology, Burla, Odisha is conducting the green auditing in 2019-2020 for a sustainable future of the campus. This audit process involved initial interviews with management to clarify policies, activities, records and the co-operation of staff and students in the implementation of mitigation measures. This was followed by staff and student interviews, collection of data through questionnaire, review of records, observation of practices and observable outcomes. Besides, the approach ensured that the management and staff are active participants in the green auditing process at the University. The findings of this report show that the University performs fairly well on sustainability issues and has made possible rectifications on the previous audit recommendations within a year. The University does consider the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the University does perform fairly well, the recommendations in this report highlight many ways in which the University can work to improve its actions and become a more sustainable university.



Summary

Rapid industrialization and urbanization have created several environmental issues which may lead to the ecological crisis. Keeping this in mind it becomes essential to adopt sustainable methods in our day to day activities. VSSUT Burla believes in the same and is striving to address issues related to environmental problems.

The purpose of the green audit is to see that the practices followed in the campus comply with the green policy adopted by the institution. The methodology includes preparation and filling up the questionnaire, physical inspection of the campus, observation and review of the documentation, data analysis, measurements and recommendations. It works on several facets like Water conservation, Tree plantation, and Waste management, use of Alternative energy source etc. The objective of the audit is to evaluate as to which degree the University comply with the same.



1. About the University

The Veer Surendra Sai University of Technology (VSSUT) Odisha was formed vide Orissa Act 9 of 2009 by converting University College of Engineering (UCE), Burla to a non-affiliating unitary university and came into force vide notification of the Industries Department, Government of Odisha in 1st July 2009 (Vide memo No. IV/TTI-33/2009-8553 and 8564 dtd. 10th June 2009). The statutes of VSSUT, Burla 2010 has been approved by the Odisha Government vide Industry Department notification No. V-FE-II-01/2010/8697 dated 21st June 2010. This state government university is also recognized by University Grants Commission (UGC), New Delhi vide UGC letter No. F.9-36/2009(CPP-I) dated 5th Jan 2010. The university is empowered to award degrees as specified by the UGC under section 22 of the UGC Act. The university has been declared eligible to receive central assistance under Section 12B of the UGC Act vide letter F.No.9-36/2009(CPP-I/PU) dated 8th November 2012.

1.1. Vision of the university

To emerge as an internationally acclaimed technical university to impart futuristic technical education and creation of vibrant research enterprise to create quality engineers and researchers, truly world-class leader and unleashes technological innovations to serve the global society and improve the quality of life.

1.2. Mission of the university

The Veer Surendra Sai University of Technology, Odisha, Burla strives to create values and ethics in its products by inculcating depth and intensity in its education standards and need-based research through

- Participative learning in a cross-cultural environment that promotes the learning beyond the classroom.
- Collaborative partnership with industries and academia within and outside the country in learning and research.



- Encouraging innovative research and consultancy through the active participation and involvement of all faculty members.
- Facilitating technology transfer, innovation and economic development to flow as natural results of research where ever appropriate.
- Expanding curricula to cater broader perspectives.
- Creation of service opportunities for upliftment of the society at large.

1.3. University Administration

- ❖ Chancellor : His Excellency Prof. Ganeshi Lal, Governor of Odisha
- ❖ Vice-Chancellor : Prof. Atal Chaudhuri
- ❖ Registrar : Smt. Upama Kalo, OAS (S)
- ❖ Comptroller of Finance : Shri. Nilam Prakash Kujur, OFS
- ❖ Director, IQAC : Prof. Bibhuti Bhusan Pati
- ❖ PIC Civil Maintenance : Prof. Sanjaya Kumar Patro
- ❖ Maintenance Engineer : Er. Akash Najk

1.4. Members of the Board of Management

- Prof. Atal Chaudhuri, Vice-Chancellor, VSSUT, Burla (Ex-officio)
- Sri Sanjay Kumar Singh, IAS, Commissioner cum Secretary, SD & TE Dept., Govt. of Odisha, Bhubaneswar (Ex-officio)
- Principal Secretary to Government, Finance Department, Government of Odisha. (Ex-officio)
- Director of Technical Education & Training, Odisha (Ex-officio)
- Hon'ble Vice-Chancellor, Biju Pattnaik University of Technology, Odisha, Rourkela
- Prof. Kusum Sudhakar Reddy, Professor, Civil Engineering, IIT, Kharagpur
- Prof. Venkappayya R Desai, Professor, Civil Engineering, IIT, Kharagpur
- Prof. H.C.S. Rathore, Vice-Chancellor, Central University of South Bihar, Patna, Bihar, UGC Nominee



- Er. Bimal Krushna Mishra, Ex-CEO, RSB Metal Tech.(P) Ltd., N2/40, IRC Village, Bhubaneswar (Alumni)
- Er. Sashi Sekhar Mohanty, CMD, Neelachal Ispat Nigam, Jajpur, Odisha (Alumni)
- Prof. Amar Nath Nayak, Professor in Civil Engineering VSSUT, Burla
- Prof. Prakash Chandra Swain, Professor in Civil Engineering VSSUT, Burla
- Dr. Rakesh Mohanty, Associate-Professor, VSS University of Technology
- Shri Kishore Kumar Mohanty, M.L.A., Jharsuguda
- Shri Debesh Acharya, M.L.A., Bargarh
- Registrar, VSSUT, Burla, Convener-cum-Secretary

2. Overview of the University:

Veer Surendra Sai University of Technology (VSSUT), Burla was established in the year 1956 as UCE, Burla - the first engineering college of the state. The university occupies over 502 acres of prime land in Burla at the foothill of world famous Hirakud dam. It is located at Burla only 10 Km away from the city center of Sambalpur Municipality, and well connected to rest of India through national highway, railway and airway. The university is surrounded by other reputed educational institutes like Sambalpur University, VSS Medical college, IIM Sambalpur, GM University, Odisha State Open University. Apart from this, a large number of public and private sector industries such as MCL, OHPC, HINDALCO, NALCO, NTPC, OPTCL, Vedanta Aluminium Ltd and Bhusan Steel Plant operate in its vicinity.

Over the years, the VSSUT, Burla has carved a niche for itself among the best technical institutes in India, and as a dream institute for many budding engineers. The University offers B.Tech., M.Tech., M.Sc., MCA and Doctoral research programmes. True to its reputation, the university has produced over 25,000 graduate engineers, and 5000 post graduate engineers including doctorates. The university has a strong alumni base and most of them have occupied coveted positions in many public offices in India, and educational, industrial and research organizations all over the world.

The university is fully residential with modern amenities and resources. It houses the administrative block cum academic building, auditorium, library, central internet facility, central



computing facility, central workshop, e-learning center, innovation cum incubation center, gymkhana, eleven halls of residence for student accommodation, guesthouse and quarters to accommodate the faculty members, officers and staff of this university. Apart from this facilities like dispensary, bank, post office, park, playground, canteen, cafeteria, etc. are available for its residents.

The university follow the philosophy of "learning in the lap of nature". In tune with the above philosophy, more than 60% of the campus is kept green. The university has lush-green landscaped campus with varieties of flowering plants and perennial tree species. The University emphasison Reduce, Reuse and Recycle of waste to reduce the environment footprint, and to preserve natural resource. The university encourage its students and staffs to adopt a sustainable framework to reduce the carbon footprints.

2.1. Key infra structures:

Sl. No.	Description	Details	Area/Plinth Area
Land In Use			
1	University		36.5 Acres
2	Hall of Residences		28.0 Acres
3	Staff Quarters		69.1 Acres
4	Free Land		266.77 Acres
5	Govt. Land Available for Extension		102.00 Acres
Construction details			
1	University Building	Main building of plinth area	1,22,715 sft
2		Workshop plinth area	27858 sft
3		Workshop office	3100 sft
4		High voltage Laboratory	1200 sft
5		Cycle shed	4600 sft
6		Garage	1660 sft
7		Guest House	3120 sft



8		Robotic Club	2700 sft
9		Auditorium	14850 sft
10		N.C.C. Building	6000 sft
11		Gymnasium	3300 sft
12		Athletic Building	1730 sft
13		Maintenance office	3200 sft
14		Dispensary	2560 sft
15		Computer Science & Engg Building	19010 sft
16		Workshop Extension	2610 sft
17		Hydraulics Laboratory extension	1140 sft
18		Cycle sheds	2120 sft
19		Library Building	14050 sft
20		Administrative Building	8530 sft
21		Extension of Electrical & ELTCE Building	2880 sft
22		Innovation and Incubation centre	15629 sft
23		Community centre	2700 sft
Total			267262 sft.
23	Halls of Residence	Atri Hall (Boys)	47260 sft
24		Kratu Hall (Boys)	47260 sft
25		Vasistha Hall (Boys)	47260 sft
26		Marichi Hall (Boys)	47260 sft
27		Pulastya Hall (Boys)	47260 sft
28		Pulaha Hall (Boys)	363630 sft
28		Angira Hall (Girls)	24160 sft
29		Arundhati Hall (Girls)	58100 sft
30		Anuradha Hall (Girls)	35000 sft



31		Visakha Hall (Girls)	35000 sft
32		Rohini Hall (For Girls)	35000 sft
		Total	787180 sft
Details of Staff Quarters			
33	A-1 Bungalow	1 No.	4725 sft
34	C	4 Nos.	12352 sft
35	D/TD	11 Nos.	15400 sft
36	E	18 Nos.	20880 sft
37	F	100 Nos.	88000 sft
38	G	29 Nos.	13050 sft
39	RS	7 Nos.	3805 sft
40	4R	5 Nos.	9750 sft
41	F4R	4 Nos.	7320 sft
42	M4R	4 Nos.	7200 sft
43	5R	6 Nos.	11220 sft
44	3R	27 Nos.	29750 sft
45	F 3R	8 Nos.	8448 sft
46	Modified E	4 Nos.	3280 sft
47	E(New)	4 Nos.	2640 sft
48	B.F	2 Nos.	1720 sft
49	B.F	14 Nos.	10640 sft
50	G.E	10 Nos.	4000 sft
Total			2,54,180 sft

2.2. Selected Photographs:



Main entrance of Academic campus



Administrative block



Academic Block



Birds eye view of academic block



Library building



Biju Patnaik e-learning center



Entrance gate of a hostel



Central park at hostel



Solar cell in the University campus



Landscaping near auditorium

3. Objectives of The Green Audit:

The green audit is carried out to promote the environment management and conservation in the university campus and around. Further, the audit aims 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 introduce and make students aware of real concerns of the environment and its sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use on the campus.



- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections require high cost.
- To bring out a status report on environmental compliance.

3.1. Methodology

The audit was carried out by questionnaire, physical inspection, observation and review of documentation, interviewing key persons. The major topics focused in the audits report are the management of Water, Waste, and Greeneries in, and around the university campus.

4. Outcomes

4.1. Water audit

The water audit is an onsite survey and assessment to determine the current usage of water and future need, and to improve the efficiency in its use. The water audit included the water supply, consumption, and appliances and fixtures.

4.1.1. Observations

The University receives 2,00,000 L/day of water from Sambalpur Municipal Corporation through Public Health Department which is used for laboratories, lavatories, gardening and drinking purpose. A well maintained treatment plant is available at the source of water supply. Further, it is mention that for obtaining drinking water number of water purification filters are positioned at different strategic locations of the university campus. During the survey, no loss of water is observed, neither by leakage nor by the overflow of water from the overhead tanks. The data collected from all the departments are examined, and verified. On average, the total use of water in the university is 2,00,000 L/day, which include 90,000 L/day for domestic purposes, 40,000 L/day for gardening and 70,000 L/day for different laboratories. The water used for drinking purpose analyzed as per IS 10500:2012 - drinking water specification and observed to be potable.

The wastewater generated from the Laboratory is stored and treated before disposal. Whereas domestic wastewater is treated in the septic tanks and soak pits.



4.1.2. Drinking water analysis report

A. Organoleptic and Physical Parameters

Sl.	Parameter	Result	Acceptable Limit as per IS10500:2012
1	Colour (Cobalt Scale) (part 4 of IS 3025)	2 Units	5 units
2	Odour (part 5 of IS 3025)	agreeable	agreeable
3	pH Value (part 11 of IS 3025)	7.4	6.5-8.5
4	Turbidity	0.2 NTU	1NTU
5	Total Dissolved Solids(mg/l)	96 mg/l	500 mg/l
6	Calcium (as Ca) (mg/l)	5 mg/l	75 mg/l
7	Chloride (as Cl) (mg/l)	16.2 mg/l	250 mg/l
8	Fluoride (as F) (mg/l)	0.15 mg/l	1.0 mg/l
9	Iron (as Fe) (mg/l)	0.05 mg/l	0.3 mg/l
10	Magnesium (as Mg) (mg/l)	4mg/l	30 mg/l
11	Nitrate (as NO ₃) (mg/l)	0.2 mg/l	45 mg/l
12	Sulphate (as SO ₄) (mg/l)	4.5 mg/l	200 mg/l
13	Total Alkalinity	40 mg/l	200 mg/l
14	Total Hardness (as CaCO ₃) (mg/l of CaCO ₃)	27mg/l	200mg/l

B. Bacteriological Analysis

Sl.	Parameter	Result	Acceptable Limit as per IS10500: 2012
15	<i>E.coli</i>	nil	nil
16	Total Coliforms	nil	nil

4.1.3. Recommendations

- Dependency on municipal corporation should be reduced. It can be achieved by minimizing the dependency for toilets and gardening.



- Dependency on rainwater harvesting need to be increased.
- Drip/sprinkler irrigation system should be used in gardens for minimizing the water consumption.
- In campus small scale/medium scale/ large scale reuse and recycle of the water system is necessary

4.2. Waste generation and treatment

Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. Therefore, this audit is conducted to addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable waste, glass, dust etc. and their recycling. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair and reuse. The survey focused on volume, type and current practice of solid waste management.

4.2.1. Observations

The total solid waste collected in the campus is around 250kg/day. Waste generated from canteen and tree droppings is a major solid waste in the campus. The waste is segregated at source by providing separated dustbins for the biodegradable and non-biodegradable waste. The biodegradable wastes generated from mess kitchen, canteen and plant litters were collected and used for composting. The paper wastes especially the cardboards are generally sold to the recyclers. To reduce the paper consumption and paper waste generation the university follows double-sided printing on papers for official purposes. Segregation of chemical waste generated in laboratories is also in practice.

Single-side used papers are reused for writing and printing in all departments. Important and confidential reports/ papers are sent for recycling to authorised recycler department after completion of their preservation period. Complying with government rules plastic has been banned. Metal waste and wooden waste are stored and given to authorized scrap agents for further processing. Glass bottles generated in laboratories are reused. The food waste from canteen and tree droppings is sent to vermicompost. All the laboratories are installed with fire extinguishers for an emergency.



4.3. E-waste Generation

E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life. Although E-wastes makes up about 5% of all municipal solid waste worldwide but is much more hazardous than other waste because electronic components contain cadmium, lead, mercury and Poly-Chlorinated Biphenyls (PCBs) which are equivalently damaging for human health and environment.

4.3.1. Observations

E-waste generated in the campus is very negligible. The campus has a total of 1028 computers and laptops, 95 printers, 18 Xerox machines, and 29 scanners in working condition. The cartridges of printers are refilled and reused. The administration conducts awareness programmes regarding e-waste management with the help of various departments. The e-waste and defective item from the computer laboratory are stored properly. These electronic waste material such as computer, computer peripherals, printer, scanner etc., where they can be reused/recycled safely, are handed over to needy organization/department. For the remaining wastes, the institution has decided to contact disposal facility and approved e-waste management for disposing of those wastes scientifically.

4.3.2. Recommendations

- As far as possible electronics instruments from reputed companies, and with a better life span should be purchased.
- E-waste generated at the University should be sent to recycle and reuse.

4.4. Land Use and Green area



This includes the available area under construction and open space available for plantation to ensure that the buildings conform to green standards. This helps in ensuring that the Environmental Policy is enacted, enforced and reviewed using various environmental awareness programmes.

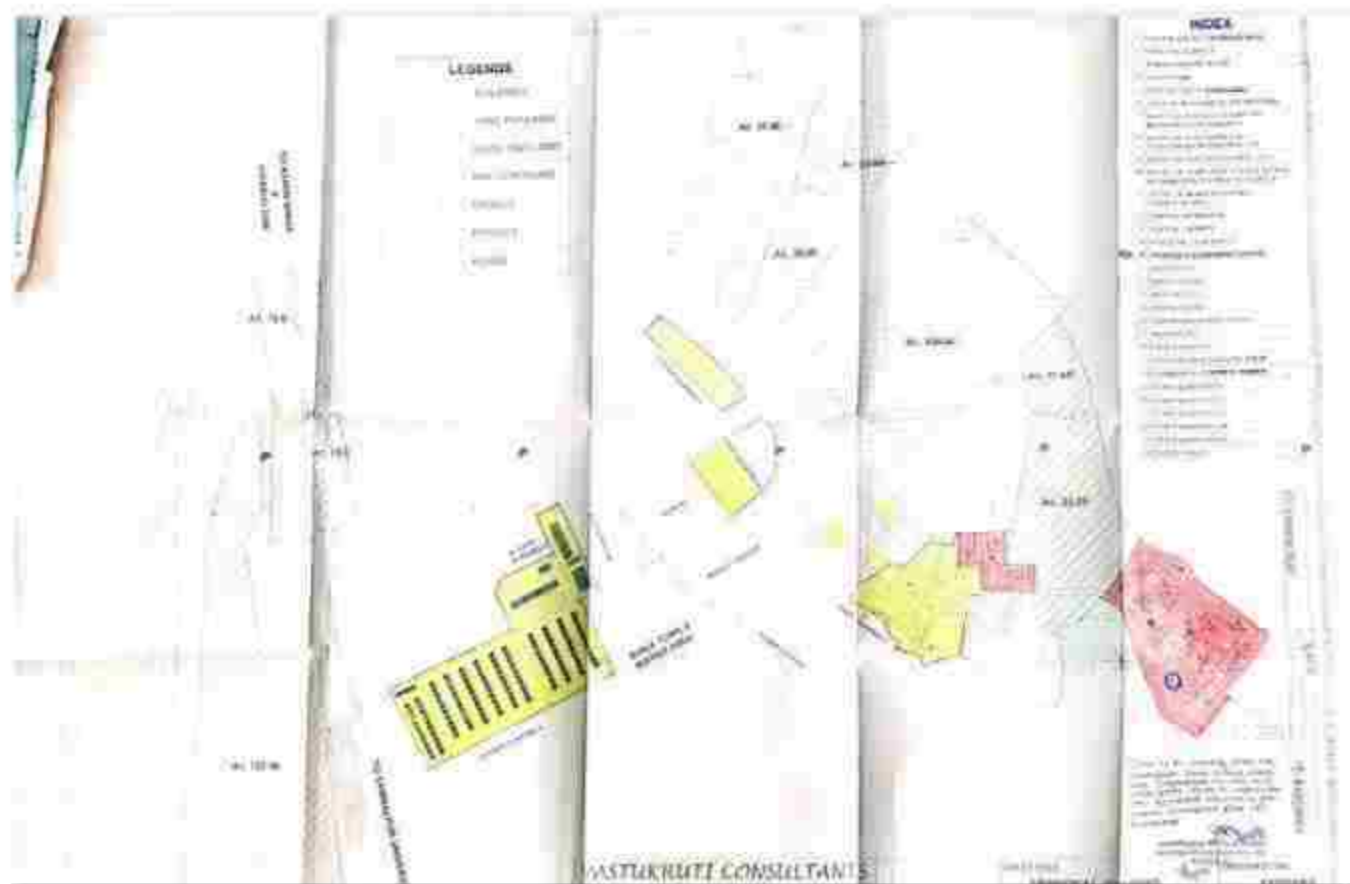
4.4.1. Chart showing Available area and area under construction.

Facility	Rooms	Carpet area Sqm:
Large ClassRooms	12	700
Small ClassRooms	69	5824
Laboratories for UG and PG Programs	49	9500
Computer Lab	3	360
Library	1	1265
Workshop	1	1675
Administrative Block	20	3,771
Seminar Hall	6	639

4.4.2. Campus & Built-up Area

- Location : Urban area
- Campus area : 166.48 Acres
- Built-up area in sq.mts : 1,39,964 Sqm.

4.4.3. University Master Plan



4.4.4. Greenery

The university attempts to maintain eco-friendly atmosphere on the campus; the number and variety of plant species help to maintain an eco-friendly ambience. Further, to create eco-friendly awareness among the students, the university arranges special programmes through where the students get clear idea and importance of trees in life. There are several perennial plant species in the campus. University has undertaken various activities like plantation and beautification of campus through various drives.

4.4.5. List of Plants



Sl.No.	Name of the Plant	Habit	Family
1	<i>Terminalia chebula</i>	Tree	Combretaceae
2	<i>Terminalia belerica</i>	Tree	Combretaceae
3	<i>Madhuca longifolia</i>	Tree	Sapotaceae
4	<i>Acacia auriculiformis</i>	Tree	Mimosaceae
5	<i>Anthocephalus Cadamba</i>	Tree	Rubiaceae
6	<i>Alstonia scholaris</i>	Tree	Apocynaceae
7	<i>Hamelia Patens</i>	Shrubs	Rubiaceae
8	<i>Bougainvillea spectabilis</i>	Climbers	Nyctaginaceae
9	<i>Ocimum sanctum</i>	Herb	Lamiaceae
10	<i>Carica papaya</i>	Herb	Caricaceae
11	<i>Cymbopogon citratus</i>	Herb	Poaceae
12	<i>Azadirachta indica</i>	tree	Meliaceae
13	<i>Tectona grandis</i>	tree	Lamiaceae
14	<i>Mangifera indica</i>	tree	Anacardiaceae
15	<i>Ficus benghalensis</i>	tree	Moraceae
16	<i>Millettia pinnata</i>	tree	Fabaceae
17	<i>Syzygium cumini</i>	tree	Myrtaceae
18	<i>Aegle marmelos</i>	tree	Rutaceae
19	<i>Caesalpinia pulcherrima</i>	tree	Fabaceae
20	<i>Peltophorum pterocarpum</i>	tree	Fabaceae

4.4.6. Selected Photographs of plantation and beautification and cleaning drive



4.4.7. Recommendation

- The University has ample green area and has utilized the available space generously in this regards. However, the university could make an understanding with local bodies to contribute to greening the spaces available with the local bodies.

4.5. Environmental Audit

This includes the assessment and monitoring of air quality, and noise levels in around the university.

4.5.1. Air Monitoring



Air quality in the academic institute is very important for the health of the students, faculty and staff of the institute. The air pollution sources in the university campus are wind, pollen grains, natural dust, vehicular emissions, and laboratory and AC fumes etc. All the pollutants were measured using standard air monitoring methods. The air pollutants monitored on regular basis are sulphur dioxide (SO_2), nitrogen oxide (NO_2), Suspended Particulate Matter (SPM), and Repairable Suspended Particulate Matter (RSPM) etc. Other relevant parameters such as temperature, humidity, pressure, and rainfall are also monitored.

Air quality near the main gate

A. Meteorological Data / Environmental Conditions

- Average wind velocity : 0.98 km/h
- Prominent wind direction : W-E
- Relative Humidity (Max./Min.) : 83/23 %

B. Air quality Report

Parameter	Result	NAAQS #2019
Sulphur Dioxide (SO_2)	2.7 $\mu\text{g}/\text{nm}^3$	20 $\mu\text{g}/\text{m}^3$ 24-hour mean
Nitrogen Dioxide (NO_2)	1.8 $\mu\text{g}/\text{nm}^3$	40 $\mu\text{g}/\text{m}^3$ annual mean
Particulate Matter (size less than 10 μm) or PM10	5.0 $\mu\text{g}/\text{nm}^3$	20 $\mu\text{g}/\text{m}^3$ annual mean
Particulate Matter (size less than 2.5 μm) or PM2.5	2.6 $\mu\text{g}/\text{nm}^3$	10 $\mu\text{g}/\text{m}^3$ annual mean
Ozone (O_3)	Negligible	100 $\mu\text{g}/\text{m}^3$ 8-hour mean
Lead	nil	0.50 $\mu\text{g}/\text{m}^3$ annual mean
Carbon Monoxide (CO)	negligible	2 $\mu\text{g}/\text{m}^3$ 8-hour mean
Ammonia (NH_3)	negligible	100 $\mu\text{g}/\text{m}^3$ annual mean

4.6. Noise Environment



The noise level measurements were carried out using the Noise Level Meter. The noise level survey was carried out at seven locations, both circulation area as well as the study area. The university is 15 kms away from the District Headquarters and 2 kms away from the National Highway and train line. The noise levels monitored in the university campus as well as inside the classroom and found the noise level within the permissible limit.

Sl. No.	Location	Minimum Reading In dB	Maximum Reading In dB	Limits
1	Near Main Gate	26	42	75
2	Near back Gate	18	38	75
3	Inside Class room	32	46	75
4	Outside Class room	27	40	75
5	Inside Library	20	25	75
6	Inside Chemistry lab	22	27	75
7	Inside Computer Centre	20	25	75

4.6.1. Recommendation

- Stand of tall trees should be planted along the front boundary wall to reduce noise and air pollution from the roadside.
- Use proper acoustic in rooms installed with heavy machines. Improvedamping for machine vibration and sound.
- A continuous air monitoring system should be procured for measurement of air pollution.

5. Conclusions

There is significant environmental awareness amongst the faculty, staff, students and initiatives taken by them are substantial. The installation of solar panels, paperless work system, composting, besides environmental awareness course initiated by the administration shows how the campus is going to be a




5. Conclusions


There is significant environmental awareness amongst the faculty, staff, students and initiatives taken by them are substantial. The installation of solar panels, paperless work system, composting, besides environmental awareness course initiated by the administration shows how the campus is going to be a Green Campus. Few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques.

As part of the green audit of the campus, the auditing carried out for monitoring of water, waste, e-waste, greenery, ventilation, illumination, airquality, noise level inside and around the campus has been carried out. It was observed that Illumination and ventilation are adequate considering natural light and air velocity present. Noise level in the campus is well within the limit. The green audit report is one of the useful means of demonstrating an organisation's commitment to openness and transparency. To promote continuous improvement it is recommended to conduct the next green auditing during the year 2021.


16/12/2020
Maintenance Engineer



16/12/2020
Prof. R.B. Panda
Professor in Chemistry


16/12/2020
Professor in Charge
Civil Maintenance


16/12/2020
External Member
Prof. P. K. Bohara
Professor in Chemistry
School of Chemistry
Sambalpur University


16.12.2020
Registrar


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Comptroller of Finance	: Shri. Nilam Prakash Kujur, OFS
Director, IQAC	: Prof. Bibhuti Bhusan Pati
PIC Civil Maintenance	: Prof. Sanjaya Kumar Patro
Maintenance Engineer	: Er. Akash Najk

1.4. Members of the Board of Management

- Prof. Atal Chaudhuri, Vice-Chancellor, VSSUT, Burla (Ex-officio)
- Sri Sanjay Kumar Singh, IAS, Commissioner cum Secretary, SD & TE Dept., Govt. of Odisha, Bhubaneswar (Ex-officio)
- Principal Secretary to Government, Finance Department, Government of Odisha. (Ex-officio)
- Director of Technical Education & Training, Odisha (Ex-officio)
- Hon'ble Vice-Chancellor, Biju Pattnaik University of Technology, Odisha, Rourkela



- Prof. Kusum Sudhakar Reddy, Professor, Civil Engineering, IIT, Kharagpur
- Prof. Venkappayya R Desai, Professor, Civil Engineering, IIT, Kharagpur
- Prof. H.C.S. Rathore, Vice-Chancellor, Central University of South Bihar, Patna, Bihar, UGC Nominee
- Er. Bimal Krushna Mishra, Ex-CEO, RSB Metal Tech.(P) Ltd., N2/40, IRC Village, Bhubaneswar (Alumni)
- Er. Sashi Sekhar Mohanty, CMD, Neelachal Ispat Nigam, Jajpur, Odisha. (Alumni)
- Prof. Amar Nath Nayak, Professor in Civil Engineering VSSUT, Burla
- Prof. Prakash Chandra Swain, Professor in Civil Engineering VSSUT, Burla
- Dr. Rakesh Mohanty, Associate Professor, VSS University of Technology
- Shri Kishore Kumar Mohanty, M.L.A., Jharsuguda
- Shri Debesh Acharya, M.L.A., Bargarh
- Registrar, VSSUT, Burla, Convener-cum-Secretary

2. Overview of the University:

Veer Surendra Sai University of Technology (VSSUT), Burla was established in the year 1956 as UCE, Burla - the first engineering college of the state. The University occupies over 502 acres of prime land in Burla at the foothill of world famous Hirakud dam. It is located at Burla only 10 Km away from the city center of Sambalpur Municipality, and well connected to rest of India through national highway, railway and airway. The University is surrounded by other reputed educational institutes like Sambalpur University, VSS Medical college, IIM Sambalpur, GM University, Odisha State Open University. Apart from this, a large number of public and private sector industries such as MCL, OHPC, HINDALCO, NALCO, NTPC, OPTCL, Vedanta Aluminium Ltd and Bhusan Steel Plant operate in its vicinity.

Over the years, the VSSUT, Burla has carved a niche for itself among the best technical institutes in India, and as a dream institute for many budding engineers. The University offers B.Tech., M.Tech., M.Sc., MCA and Doctoral research programmes. True to its reputation, the University has produced over 25,000 graduate engineers, and 5000 post graduate engineers including doctorates. The University has a strong alumni base and most of them have occupied coveted positions in many public offices in India, and educational, industrial and research organizations all over the world.



The University is fully residential with modern amenities and resources. It houses the administrative block cum academic building, auditorium, library, central internet facility, central computing facility, central workshop, e-learning center, innovation cum incubation center, gymkhana, eleven halls of residence for student accommodation, guesthouse and quarters to accommodate the faculty members, officers and staff of this University. Apart from these facilities like dispensary, bank, post office, park, playground, canteen, cafeteria, etc. are available for its residents. New state-of-art computer center, gymkhana, and swimming pool are under construction.

The University follows the philosophy of "learning in the lap of nature". In tune with the above philosophy, more than 60% of the campus is kept green. The University has lush-green landscaped campus with varieties of flowering plants and perennial tree species. The University emphasizes Reduce, Reuse and Recycle of waste to reduce the environment footprint, and to preserve natural resource. The University encourages its students and staffs to adopt a sustainable framework to reduce the carbon footprints.

2.1. Key infra structures:

Sl. No.	Description	Details	Area/Plinth Area
Land In Use			
1	University		36.5 Acres
2	Hall of Residences		28.0 Acres
3	Staff Quarters		69.1 Acres
4	Free Land		266.77 Acres
5	Govt. Land Available for Extension		102.00 Acres
Construction details			
1	University Building	Main building of plinth area	1,22,715 sft
2		Workshop plinth area	27858 sft
3		Workshop office	3100 sft
4		High voltage Laboratory	1200 sft



5		Cycle shed	4600 sft
6		Garage	1660 sft
7		Guest House	3120 sft
8		Robotic Club	2700 sft
9		Auditorium	14850 sft
10		N.C.C. Building	6000 sft
11		Gymnasium	3300 sft
12		Athletic Building	1730 sft
13		Maintenance office	3200 sft
14		Dispensary	2560 sft
15		Computer Science & Engg. Building	19010 sft
16		Workshop Extension	2610 sft
17		Hydraulics Laboratory extension	1140 sft
18		Cycle sheds	2120 sft
19		Library Building	14050 sft
20		Administrative Building	8530 sft
21		Extension of Electrical & ELTCE Building	2880 sft
22		Innovation and Incubation centre	15629 sft
23		Community centre	2700 sft
		Total	267262 sft.
23	Halls of Residence	Atri Hall (Boys)	47260 sft
24		Kratu Hall (Boys)	47260 sft
25		Vasistha Hall (Boys)	47260 sft
26		Marichi Hall (Boys)	47260 sft
27		Pulastya Hall (Boys)	47260 sft
28		Pulaha Hall (Boys)	363620 sft
28		Angira Hall (Girls)	24160 sft



29		Arundhati Hall (Girls)	58100 sft
30		Anuradha Hall (Girls)	35000 sft
31		Visakha Hall (Girls)	35000 sft
32		Rohini Hall (For Girls)	35000 sft
		Total	787180 sft
Details of Staff Quarters			
33	A-1 Bungalow	1 No.	4725 sft
34	C	4 Nos.	12352 sft
35	D/TD	11 Nos.	15400 sft
36	E	18 Nos.	20880 sft
37	F	100 Nos.	88000 sft
38	G	29 Nos.	13050 sft
39	RS	7 Nos.	3805 sft
40	4R	5 Nos.	9750 sft
41	F4R	4 Nos.	7320 sft
42	M4R	4 Nos.	7200 sft
43	5R	6 Nos.	11220 sft
44	3R	27 Nos.	29750 sft
45	F 3R	8 Nos.	8448 sft
46	Modified E	4 Nos.	3280 sft
47	E(New)	4 Nos.	2640 sft
48	B.F	2 Nos.	1720 sft
49	B.F	14 Nos.	10640 sft
50	G.E	10 Nos.	4000 sft
Total			2,54,180 sft



2.2. Selected Photographs:



Main entrance of Academic campus



Administrative block



Academic Block



Birds eye view of academic block



Library building



Biju Patnaik e-learning center



Entrance gate of a hostel



Central park at hostel



Low cost rammed earth building for coffee center



Landscaping near auditorium

3. Objectives of The Green Audit:

The green audit is carried out to promote the environment management and conservation in the University campus and around. Further, the audit aims 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 introduce and make students aware of real concerns of the environment and its sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use on the campus.
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections require high cost.
- To bring out a status report on environmental compliance.



3.1. Methodology

The audit was carried out by questionnaire, physical inspection, observation and review of documentation, interviewing key persons. The major topics focused in the audits report are the management of Water, Waste, and Greeneries in, and around the University campus.

4. Outcomes

4.1. Water audit

The water audit is an onsite survey and assessment to determine the current usage of water and future need, and to improve the efficiency in its use. The water audit included the water supply, consumption, and appliances and fixtures.

4.1.1. Observations

The University receives 2,00,000 L/day of water from Sambalpur Municipal Corporation through Public Health Department which is used for laboratories, lavatories, gardening and drinking purpose. A well maintained treatment plant is available at the source of water supply. Further, it is mention that for obtaining drinking water number of water purification filters are positioned at different strategic locations of the University campus. During the survey, no loss of water is observed, neither by leakage nor by the overflow of water from the overhead tanks. The data collected from all the departments are examined, and verified. On average, the total use of water in the University is 2,00,000 L/day, which include 90,000 L/day for domestic purposes, 40,000 L/day for gardening and 70,000 L/day for different laboratories. The water used for drinking purpose analyzed as per IS 10500:2012 - drinking water specification and observed to be potable.

The wastewater generated from the Laboratory is stored and treated before disposal. Whereas domestic wastewater is treated in the septic tanks and soak pits.



4.1.2. Drinking water analysis report

A. Organoleptic and Physical Parameters

Sl.	Parameter	Result	Acceptable Limit as per IS 10500:2012
1	Colour (Cobalt Scale) (part 4 of IS 3025)	2 Units	5 units
2	Odour (part 5 of IS 3025)	agreeable	agreeable
3	pH Value (part 11 of IS 3025)	7.4	6.5-8.5
4	Turbidity	0.2 NTU	1NTU
5	Total Dissolved Solids(mg/l)	96 mg/l	500 mg/l
6	Calcium (as Ca) (mg/l)	5 mg/l	75 mg/l
7	Chloride (as Cl) (mg/l)	16.2 mg/l	250 mg/l
8	Fluoride (as F) (mg/l)	0.15 mg/l	1.0 mg/l
9	Iron (as Fe) (mg/l)	0.05 mg/l	0.3 mg/l
10	Magnesium (as Mg) (mg/l)	4mg/l	30 mg/l
11	Nitrate (as NO ₃) (mg/l)	0.2 mg/l	45 mg/l
12	Sulphate (as SO ₄) (mg/l)	4.5 mg/l	200 mg/l
13	Total Alkalinity	40 mg/l	200 mg/l
14	Total Hardness (as CaCO ₃) (mg/l of CaCO ₃)	27mg/l	200mg/l

B. Bacteriological Analysis

Sl.	Parameter	Result	Acceptable Limit as per IS 10500: 2012
15	<i>E.coli</i>	nil	nil
16	Total Coliforms	nil	nil

4.1.3. Recommendations

- Dependency on municipal corporation should be reduced. It can be achieved by minimizing the dependency for toilets and gardening.
- Dependency on rainwater harvesting need to be increased.



- Drip/sprinkler irrigation system should be used in gardens for minimizing the water consumption.
- In campus small scale/medium scale/ large scale reuse and recycle of the water system is necessary

4.2. Waste generation and treatment

Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. Therefore, this audit is conducted to addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable waste, glass, dust etc. and their recycling. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair and reuse. The survey focused on volume, type and current practice of solid waste management.

4.2.1. Observations

The total solid waste collected in the campus is around 250kg/day. Waste generated from canteen and tree droppings is a major solid waste in the campus. The waste is segregated at source by providing separated dustbins for the biodegradable and non-biodegradable waste. The biodegradable wastes generated from mess kitchen, canteen and plant litters were collected and used for composting. The paper wastes especially the cardboards are generally sold to the recyclers. To reduce the paper consumption and paper waste generation the University follows double-sided printing on papers for official purposes. Segregation of chemical waste generated in laboratories is also in practice.

Single-side used papers are reused for writing and printing in all departments. Important and confidential reports/ papers are sent for recycling to authorised recycler department after completion of their preservation period. Complying with government rules plastic has been banned. Metal waste and wooden waste are stored and given to authorized scrap agents for further processing. Glass bottles generated in laboratories are reused. The food waste from canteen and tree droppings is sent to vermicompost. All the laboratories are installed with fire extinguishers for an emergency.



4.3. E-waste Generation

E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life. Although, E-wastes makes up about 5% of all municipal solid waste worldwide but is much more hazardous than other waste because electronic components contain cadmium, lead, mercury and Poly-Chlorinated Biphenyls (PCBs) which are equivalently damaging for human health and environment.

4.3.1. Observations

E-waste generated in the campus is very negligible. The campus has a total of 1028 computers and laptops, 95 printers, 18 Xerox machines, and 29 scanners in working condition. The cartridges of printers are refilled and reused. The administration conducts awareness programmes regarding e-waste management with the help of various departments. The e-waste and defective item from the computer laboratory are stored properly. These electronic waste material such as computer, computer peripherals, printer, scanner etc., where they can be reused/recycled safely, are handed over to needy organization/department. For the remaining wastes, the institution has decided to contact disposal facility and approved e-waste management for disposing of those wastes scientifically.

4.3.2. Recommendations

- As far as possible electronics instruments from reputed companies, and with a better life span should be purchased.
- E-waste generated at the University should be sent to recycle and reuse.



Solar cell in the University campus

4.4. Land Use and Green area

This includes the available area under construction and open space available for plantation to ensure that the buildings conform to green standards. This helps in ensuring that the Environmental Policy is enacted, enforced and reviewed using various environmental awareness programmes.

4.4.1. Chart showing Available area and area under construction.

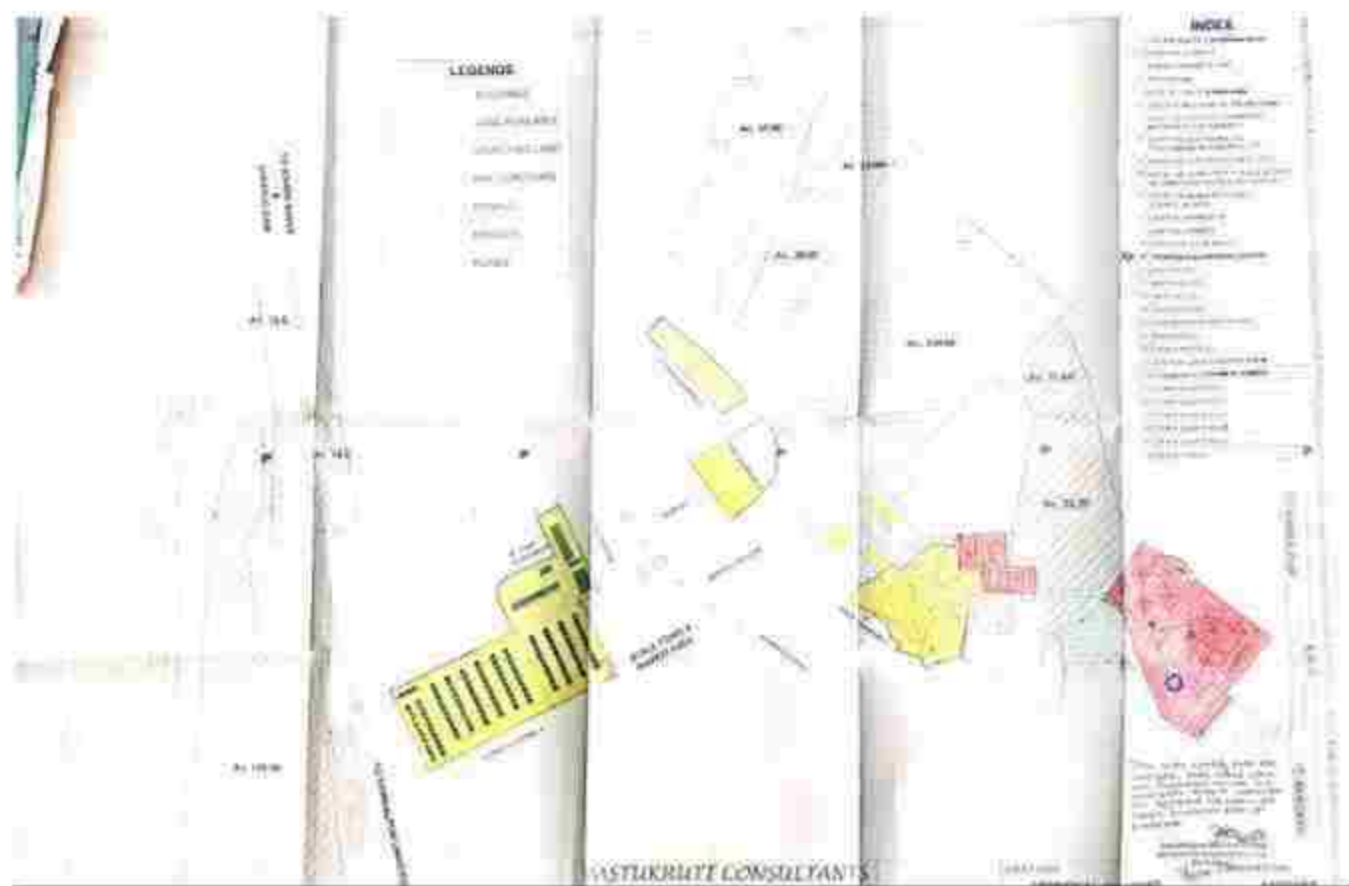
Facility	Rooms	Carpet area Sqm.
Large ClassRooms	12	700
Small ClassRooms	69	5824
Laboratories for UG and PG Programs	49	9500
Computer Lab	3	360
Library	1	1265
Workshop	1	1675
Administrative Block	20	3,771
Seminar Hall	6	639



4.4.2. Campus & Built-up Area

- Location : Urban area
- Campus area : 166.48 Acres
- Built-up area in sq.mts : 1,39,964 Sqm.

4.4.3. University Master Plan



4.4.4. Greenery

The University attempts to maintain eco-friendly atmosphere on the campus; the number and variety of plant species help to maintain an eco-friendly ambience. Further, to create eco-friendly awareness among the students, the University arranges special programmes through where the students get clear



idea and importance of trees in life. There are several perennial plantspecies in the campus. University has undertaken various activities like plantation and beautification of campus through various drives.

4.4.5. List of Plants

Sl.No.	Name of the Plant	Habit	Family
1	Terminalia chebula	Tree	Combretaceae
2	Terminalia belerica	Tree	Combretaceae
3	Madhuca longifolia	Tree	Sapotaceae
4	Acacia auriculiformis	Tree	Mimosaceae
5	Anthocephalus Cadamba	Tree	Rubiaceae
6	Alstonia scholaris	Tree	Apocynaceae
7	Hamelia Patens	Shrubs	Rubiaceae
8	Bougainvillea spectabilis	Climbers	Nyctaginaceae
9	Ocimum sanctum	Herb	Lamiaceae
10	Carica papaya	Herb	Caricaceae
11	Cymbopogon citratus	Herb	Poaceae
12	Azadirachta indica	tree	Meliaceae
13	Tectona grandis	tree	Lamiaceae
14	Mangifera indica	tree	Anacardiaceae
15	Ficus benghalensis	tree	Moraceae
16	Millettia pinnata	tree	Fabaceae
17	Syzygium cumini	tree	Myrtaceae
18	Aegle marmelos	tree	Rutaceae



19	Caesalpinia pulcherrima	tree	Fabaceae
20	Peltophorum pterocarpum	tree	Fabaceae

4.4.6. Selected Photographs of plantation and beautification and cleaning drive



4.4.7. Recommendation

- The University has ample green area and has utilized the available space generously in this regards. However, the University could make an understanding with local bodies to contribute to greening the spaces available with the local bodies.



4.5. Environmental Audit

This includes the assessment and monitoring of air quality, and noise levels in around the University.

4.5.1. Air Monitoring

Air quality in the academic institute is very important for the health of the students, faculty and staff of the institute. The air pollution sources in the University campus are wind, pollen grains, natural dust, vehicular emissions, and laboratory and AC fumes etc. All the pollutants were measured using standard air monitoring methods. The air pollutants monitored on regular basis are sulphur dioxide (SO₂), nitrogen oxide(NO₂), Suspended Particulate Matter (SPM), and Repairable Suspended Particulate Matter (RSPM) etc Other relevant parameters such as temperature, humidity, pressure, and rainfall are also monitored.

Air quality near the main gate

A. Meteorological Data / Environmental Conditions

- Average wind velocity : 0.98 km/h
- Prominent wind direction : W-E
- Relative Humidity (Max./Min.) : 83/23 %

B. Air quality Report

Parameter	Result	NAAQS #2019
Sulphur Dioxide (SO ₂)	2.7 µg/nm ³	20 µg/m ³ 24-hour mean
Nitrogen Dioxide (NO ₂)	1.8 µg/nm ³	40 µg/m ³ annual mean
Particulate Matter (size less than 10 µm) or PM ₁₀	5.0 µg/nm ³	20 µg/m ³ annual mean
Particulate Matter (size less than 2.5 µm) or PM _{2.5}	2.6 µg/nm ³	10 µg/m ³ annual mean
Ozone (O ₃)	Negligible	100 µg/m ³ 8-hour mean
Lead	nil	0.50 µg/m ³ annual mean



Carbon Monoxide (CO)	negligible	2 µg/m ³ 8-hour mean
Ammonia (NH ₃)	negligible	100 µg/m ³ annual mean

4.6. Noise Environment

The noise level measurements were carried out using the Noise Level Meter. The noise level survey was carried out at seven locations, both circulation area as well as the study area. The University is 15 kms away from the District Headquarters and 2 kms away from the National Highway and train line. The noise levels monitored in the University campus as well as inside the classroom and found the noise level within the permissible limit.

Sl. No.	Location	Minimum Reading In dB	Maximum Reading In dB	Limits
1	Near Main Gate	26	42	75
2	Near back Gate	18	38	75
3	Inside Class room	32	46	75
4	Outside Class room	27	40	75
5	Inside Library	20	25	75
6	Inside Chemistry lab	22	27	75
7	Inside Computer Centre	20	25	75

4.6.1. Recommendation

- Stand of tall trees should be planted along the front boundary wall to reduce noise and air pollution from the roadside.
- Use proper acoustic in rooms installed with heavy machines. Improved damping for machine vibration and sound.
- A continuous air monitoring system should be procured for measurement of air pollution.

5. Conclusions

There is significant environmental awareness amongst the faculty, staff, students and initiatives taken by them are substantial. The installation of solar panels, paperless work system, composting, besides



environmental awareness course initiated by the administration shows how the campus is going to be a Green Campus. Few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques.

As part of the green audit of the campus, the auditing carried out for monitoring of water, waste, e-waste, greenery, ventilation, illumination, airquality, noise level inside and around the campus has been carried out. It was observed that Illumination and ventilation are adequate considering natural light and air velocity present. Noise level in the campus is well within the limit. The green audit report is one of the useful means of demonstrating an organisation's commitment to openness and transparency. To promote continuous improvement it is recommended to conduct the next green auditing during the year 2021.


16/12/2020
Maintenance Engineer



16/12/2020
Prof. R.B. Panda
Professor in Chemistry


16/12/2020
Professor in Charge
Civil Maintenance


16/12/2020
External Member
Prof. P. K. Behera
Professor in Chemistry
School of Chemistry
Sambalpur University


16.12.2020
Registrar


16.12.2020
Director, IQAC


16.12.2020
Vice-Chancellor

GREEN AUDIT REPORT

2020-2021



VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY
ODISHA, BURLA-768018
INDIA



Vice-Chancellor

Veer Surendra Sai University of Technology, Burla

Dist. Sambalpur – 768018, Odisha

vc@vssut.ac.in

From the Desk of Chairperson, IQAC

Veer Surendra Sai University of Technology, Burla, Odisha has prepared the green auditing in 2020-2021 for a sustainable future of the campus. This audit process comprised initial interviews with management to clarify policies, activities, records and the co-operation of staff and students in the implementation of mitigation measures. This was followed by staff and student interviews, collection of data through questionnaire, review of records, observation of practices and observable outcomes. Besides, the approach ensured that the management and staff are active participants in the green auditing process at the University. The findings of this report shows that the University performs fairly well on sustainability issues and has implemented the previous audit recommendations. The University considers the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the University does perform fairly well, the recommendations in this report highlight the different meance to be adopted by the University to improve its actions to be one exemplary sustainable university.



Summary

Rapid industrialization and urbanization have created several environmental issues which may lead to the ecological crisis. Keeping this in mind it becomes essential to adopt sustainable methods in our day to day activities. VSSUT Burla believes in the same and is striving to address issues related to environmental problems.

The purpose of the green audit is to see that the practices followed in the campus comply with the green policy adopted by the institution. The methodology includes preparation and filling up the questionnaire, physical inspection of the campus, observation and review of the documentation, data analysis, measurements and recommendations. It works on several facets like Water conservation, Tree plantation, and Waste management, use of Alternative energy source etc. The objective of the audit is to evaluate as to which degree the University comply with the same.



1. About the University

The Veer Surendra Sai University of Technology (VSSUT) Odisha was formed vide Orissa Act 9 of 2009 by converting University College of Engineering (UCE), Burla to a non-affiliating unitary university and came into force vide notification of the Industries Department, Government of Odisha on 1st July 2009 (Vide memo No. IV/ITI-33/2009-8553 and 8564 dtd. 10th June 2009). The statutes of VSSUT, Burla 2010 has been approved by the Odisha Government vide Industry Department notification No. V-FE-II-01/2010/8697 dated 21st June 2010. This state government university is also recognized by University Grants Commission (UGC), New Delhi vide UGC letter No. F.9-36/2009(CPP-1) dated 5th Jan 2010. The university is empowered to award degrees as specified by the UGC under section 22 of the UGC Act. The university has been declared eligible to receive central assistance under Section 12B of the UGC Act vide letter F.No.9-36/2009(CPP-I/PU) dated 8th November 2012.

1.1. Vision of the university

To emerge as an internationally acclaimed technical university to impart futuristic technical education and creation of vibrant research enterprise to create quality engineers and researchers, truly world-class leader and unleashes technological innovations to serve the global society and improve the quality of life.

1.2. Mission of the university

The Veer Surendra Sai University of Technology, Odisha, Burla strives to create values and ethics in its products by inculcating depth and intensity in its education standards and need-based research through

- Participative learning in a cross-cultural environment that promotes the learning beyond the classroom.
- Collaborative partnership with industries and academia within and outside the country in learning and research.



- Encouraging innovative research and consultancy through the active participation and involvement of all faculty members.
- Facilitating technology transfer, innovation and economic development to flow as natural results of research where ever appropriate.
- Expanding curricula to cater broader perspectives.
- Creation of service opportunities for upliftment of the society at large.

1.3. University Administration

Chancellor	: His Excellency Prof. Ganeshi Lal, Governor of Odisha
Vice-Chancellor	: Prof. Banshidhar Majhi
Registrar	: Smt. UpamaKalo, OAS (SAG)
Comptroller of Finance	: Sri. Tularam Kalet, OFS-1 (SB)
Director, IQAC	: Prof. Debabrata Dhupal
PIC Civil Works	: Prof. Ramakanta Panigrahi
Maintenance Engineer	: Er. Pratap Kumar Pradhan

1.4. Members of the Board of Management

- Prof. Banshidhar Majhi, Vice-Chancellor, VSSUT, Burla (Ex-officio)
- Sri Hemant Sharama, IAS, principal Secretary, Skill Development & Technical Education Department, Government of Odisha, Bhubaneswar (Ex-officio)
- Director of Technical Education & Training, Odisha (Ex-officio)
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- Smt Upama Kalo, OAS (SAG), Registrara, VSSUT, Burla
- Dr Damodar Acharya, DN Oxy Park, Tower II, 16th Floor, Flat No 2173, Dumduma, Bhubaneswar 751019, AICTE Nominee
- Prof. P C Swain, Professor in Civil Engineering, VSSUT, Burla, VC Nominee
- Prof. Debadutta Mishra, Professor in Production Engineering VSSUT, Burla, VC Nominee
- Prof. Sidharth Panda, Professor in Electrical Engineering VSSUT, Burla, Academic Council Nominee
- Prof Sanjaya Kumar Patro, Professor in Civil Engineering, VSSUT, Burla, Academic Council Nominee
- Prof. Ratnam V. Raja Kumar, Director, IIT Bhubaneswar, Chancellor's Nominee (Reputed Institute)
- Er Ashesh Padhy, VP and Head-Projects, JSW, Paradip Steel Project, Chancellor's Nominee (Alumni)
- Prof. Sukumar Mishra, Professor in Electrical Engineering, IIT Delhi, Chancellor's Nominee (Alumni)
- Shri Debesh Acharya, M.L.A., Bargarh

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8		Robotic Club	2700 sft
9		Auditorium	14850 sft
10		N.C.C. Building	6000 sft
11		Gymnasium	3300 sft
12		Athletic Building	1730 sft
13		Maintenance office	3200 sft
14		Dispensary	2560 sft
15		Computer Science & Engg. Building	19010 sft
16		Workshop Extension	2610 sft
17		Hydraulics Laboratory extension	1140 sft
18		Cycle sheds	2120 sft
19		Library Building	14050 sft
20		Administrative Building	8530 sft
21		Extension of Electrical & E.L.T.C. Building	2880 sft
22		Community centre	2700 sft
23		Central Computer Centre	8181 sft
24		Innovation Centre	10420 sft
25		Swimming Pool	2610 sft
26		Gymnasium	16811 sft
27		E Learning Centre	10420 sft
		Total	300083 sft.



23	Halls of Residence	Atri Hall (Boys)	47260 sft	
24		Kratu Hall (Boys)	47260 sft	
25		Vasistha Hall (Boys)	47260 sft	
26		Marichi Hall (Boys)	47260 sft	
27		Pulastya Hall (Boys)	47260 sft.	
28		Pulaha Hall (Boys)	363620 sft.	
28		Agastya Hall (Boys)	93582 sft.	
29		Angira Hall (Girls)	24160 sft.	
30		Arundhati Hall (Girls)	58100 sft	
31		Anuradha Hall (Girls)	35000 sft.	
32		Visakha Hall (Girls)	35000 sft.	
33		Rohini Hall (For Girls)	35000 sft.	
			Total	880762 sft

Details of Staff Quarters

33	A-1 Bungalow	1 No.	4725 sft
34	C	4 Nos.	12352 sft
35	D/TD	11 Nos.	15400 sft
36	E	18 Nos.	20880 sft
37	F	100 Nos.	88000 sft
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47	E(New)	4 Nos.	2640 sft
48	B.F	2 Nos.	1720 sft



40	B.F	14 Nos.	10640 sft
50	G.F	10 Nos.	4000 sft
Total			254180 sft

2.2. Selected Photographs:



Main entrance of Academic campus



Administrative block



Academic Block



Birds eye view of academic block



Library building



Biju Patnaik e-learning center



Entrance gate of a hostel



Central park at hostel



Low cost rammed earth building for coffee center



Landscaping near auditorium

3. Objectives of The Green Audit:

The green audit is carried out to promote the environment management and conservation in the university campus and around. Further, the audit aims 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 introduce and make students aware of real concerns of the environment and its sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use on the campus.
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections require high cost.
- To bring out a status report on environmental compliance.



3.1. Methodology

The audit was carried out by questionnaire, physical inspection, observation and review of documentation, interviewing key persons. The major topics focused in the audits report are the management of Water, Waste, and Greeneries in, and around the university campus.

4. Outcomes

4.1. Water audit

The water audit is an onsite survey and assessment to determine the current usage of water and future need, and to improve the efficiency in its use. The water audit included the water supply, consumption, and appliances and fixtures.

4.1.1. Observations

The University receives 2,35,000 L/day of water from Sambalpur Municipal Corporation through Public Health Department which is used for laboratories, lavatories, gardening and drinking purpose. A well maintained treatment plant is available at the source of water supply. Further, it is mention that for obtaining drinking water number of water purification filters are positioned at different strategic locations of the university campus. During the survey, no loss of water is observed, neither by leakage nor by the overflow of water from the overhead tanks. The data collected from all the departments are examined, and verified. On average, the total use of water in the university is 2,35,000 L/day, which include 1,10,000 L/day for domestic purposes, 50,000 L/day for gardening and 75,000 L/day for different laboratories. The water used for drinking purpose analyzed as per IS 10500:2012 - drinking water specification and observed to be potable.

The wastewater generated from the Laboratory is stored and treated before disposal. Whereas domestic wastewater is treated in the septic tanks and soak pits.



4.1.2. Drinking water analysis report

A. Organoleptic and Physical Parameters

Sl.	Parameter	Result	Acceptable Limit as per IS 10500:2012
1	Colour (Cobalt Scale) (part 4 of IS 3025)	2 Units	5 units
2	Odour (part 5 of IS 3025)	agreeable	agreeable
3	pH Value (part 11 of IS 3025)	7.4	6.5-8.5
4	Turbidity	0.2 NTU	1NTU
5	Total Dissolved Solids(mg/l)	96 mg/l	500 mg/l
6	Calcium (as Ca) (mg/l)	5 mg/l	75 mg/l
7	Chloride (as Cl) (mg/l)	16.2 mg/l	250 mg/l
8	Fluoride (as F) (mg/l)	0.15 mg/l	1.0 mg/l
9	Iron (as Fe) (mg/l)	0.05 mg/l	0.3 mg/l
10	Magnesium (as Mg) (mg/l)	4mg/l	30 mg/l
11	Nitrate (as NO ₃) (mg/l)	0.2 mg/l	45 mg/l
12	Sulphate (as SO ₄) (mg/l)	4.5 mg/l	200 mg/l
13	Total Alkalinity	40 mg/l	200 mg/l
14	Total Hardness (as CaCO ₃) (mg/l of CaCO ₃)	27mg/l	200mg/l

B. Bacteriological Analysis

Sl.	Parameter	Result	Acceptable Limit as per IS 10500: 2012
15	<i>E.coli</i>	nil	nil
16	Total Coliforms	nil	nil

4.1.3. Recommendations

- Dependency on municipal corporation should be reduced. It can be achieved by minimizing the dependency for toilets and gardening.
- Dependency on rainwater harvesting need to be increased.



- Drip/sprinkler irrigation system should be used in gardens for minimizing the water consumption.
- In campus small scale/medium scale/ large scale reuse and recycle of the water system is necessary

4.2. Waste generation and treatment

Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. Therefore, this audit is conducted to address waste production and disposal of different wastes like paper, food, plastic, biodegradable waste, glass, dust etc. and their recycling. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair and reuse. The survey focused on volume, type and current practice of solid waste management.

4.2.1. Observations

The total solid waste collected in the campus is around 250kg/day. Waste generated from canteen and tree droppings is a major solid waste in the campus. The waste is segregated at source by providing separated dustbins for the biodegradable and non-biodegradable waste. The biodegradable wastes generated from mess kitchen, canteen and plant litters were collected and used for composting. The paper wastes especially the cardboards are generally sold to the recyclers. To reduce the paper consumption and paper waste generation the university follows double-sided printing on papers for official purposes. Segregation of chemical waste generated in laboratories is also in practice.

Single-side used papers are reused for writing and printing in all departments. Important and confidential reports/ papers are sent for recycling to authorised recycler department after completion of their preservation period. Complying with government rules plastic has been banned. Metal waste and wooden waste are stored and given to authorized scrap agents for further processing. Glass bottles generated in laboratories are reused. The food waste from canteen and tree droppings is sent to vermicompost. All the laboratories are installed with fire extinguishers for an emergency.



4.3. E-waste Generation

E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life. Although E-wastes makes up about 5% of all municipal solid waste worldwide but is much more hazardous than other waste because electronic components contain cadmium, lead, mercury and Poly-Chlorinated Biphenyls (PCBs) which are equivalently damaging for human health and environment.

4.3.1. Observations

E-waste generated in the campus is very negligible. The campus have total of 1028 computers and laptops, 95 printers, 18 Xerox machines, and 29 scanners in working condition. The cartridges of printers are refilled and reused. The administration conducts awareness programmes regarding e-waste management with the help of various departments. The e-waste and defective item from the computer laboratory are stored properly. These electronic waste material such as computer, computer peripherals, printer, scanner etc., where they can be reused/recycled safely, are handed over to needy organization department. For the remaining wastes, the institution has decided to contact disposal facility and approved e-waste management for disposing of those wastes scientifically.

4.3.2. Recommendations

- As far as possible electronics instruments from reputed companies with a better life span should be purchased.
- E-waste generated at the University should be sent to recycle and reuse.



Solar cell in the University campus

4.4. Land Use and Green area

This includes the available area under construction and open space available for plantation to ensure that the buildings conform to green standards. This helps in ensuring that the Environmental Policy is enacted, enforced and reviewed using various environmental awareness programmes.

4.4.1. Chart showing Available area and area under construction.

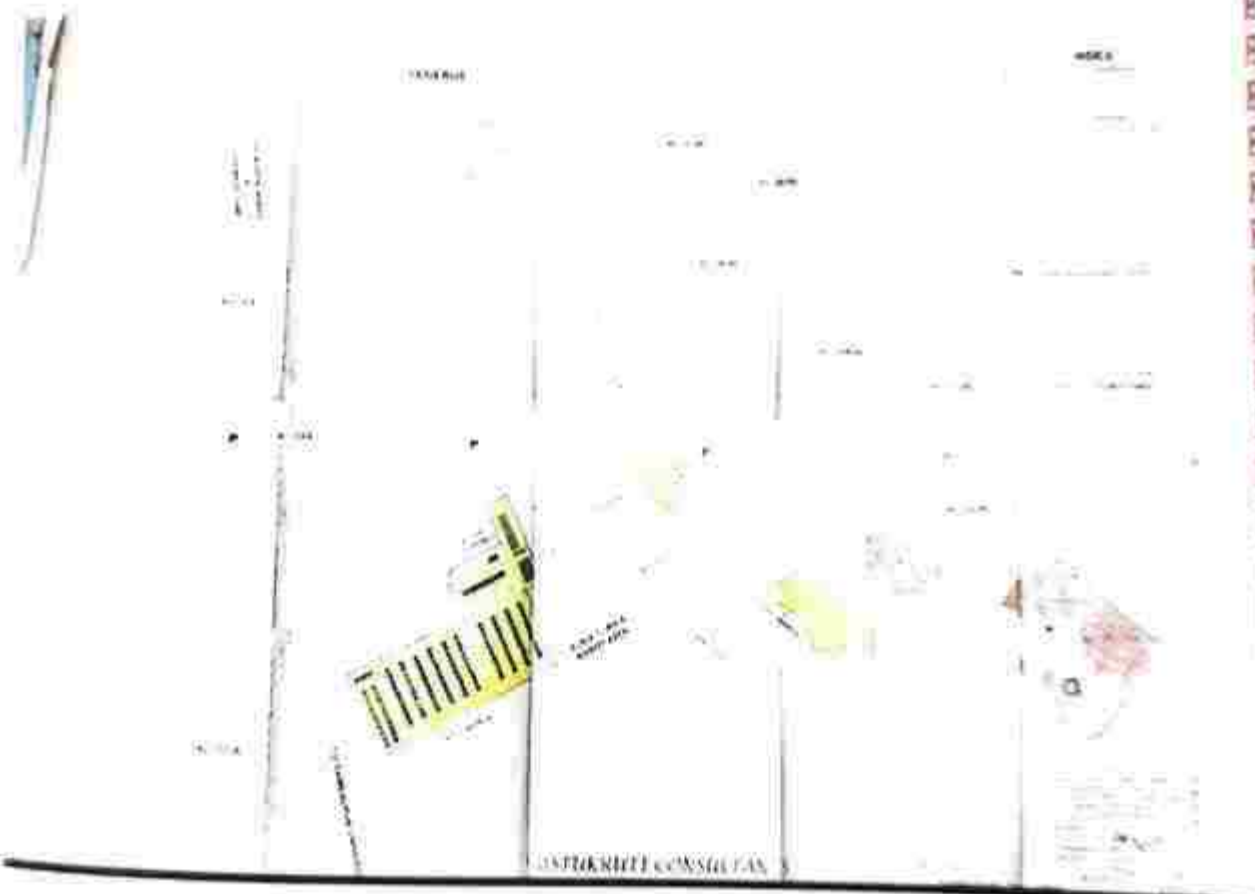
Facility	Rooms	Carpet area Sqm.
Large ClassRooms	12	700
Small ClassRooms	69	5824
Laboratories for UG and PG Programs	49	9500
Computer Lab	3	360
Library	1	1265
Workshop	1	1675
Administrative Block	20	3,771
Seminar Hall	6	639



4.4.2. Campus & Built-up Area

- Location Urban area
- Campus area 166.48 Acres.
- Built-up area in sq.mts 1,39,964 Sqm

4.4.3. University Master Plan



4.4.4. Greenery

The university attempts to maintain eco-friendly atmosphere on the campus, the number and variety of plant species help to maintain an eco-friendly ambience. Further, to create eco-friendly awareness among the students, the university arranges special programmes through where the students get clear



idea and importance of trees in life. There are several perennial plantspecies in the campus. University has undertaken various activities like plantation and beautification of campus through various drives.

4.4.5. List of Plants

Sl.No.	Name of the Plant	Habit	Family
1.	Terminalia chebula	Tree	Combretaceae
2.	Terminalia belerica	Tree	Combretaceae
3.	Madhuca longifolia	Tree	Sapotaceae
4.	Acacia auriculiformis	Tree	Mimosaceae
5.	Anthocephalus Cadamba	Tree	Rubiaceae
6.	Alstonia scholaris	Tree	Apocynaceae
7.	Hamelia Patens	Shrubs	Rubiaceae
8.	Bougainvillea spectabilis	Climbers	Nyctaginaceae
9.	Ocimum sanctum	Herb	Lamiaceae
10.	Carica papaya	Herb	Caricaceae
11.	Cymbopogon citratus	Herb	Poaceae
12.	Azadirachta indica	tree	Meliaceae
13.	Tectona grandis	tree	Lamiaceae
14.	Mangifera indica	tree	Anacardiaceae
15.	Ficus benghalensis	tree	Moraceae
16.	Millettia pinnata	tree	Fabaceae
17.	Syzygium cumini	tree	Myrtaceae
18.	Aegle marmelos	tree	Rutaceae



19	Caesalpinia pulcherrima	tree	Fabaceae
20	Peltophorum pterocarpum	tree	Fabaceae

4.4.6. Selected Photographs of plantation and beautification and cleaning drive



4.4.7. Recommendation

- The University has ample green area and has utilized the available space generously in this regards. However, the university could make an understanding with local bodies to contribute to greening the spaces available with the local bodies.



4.5. Environmental Audit

This includes the assessment and monitoring of air quality, and noise levels in around the university.

4.5.1. Air Monitoring

Air quality in the academic institute is very important for the health of the students, faculty and staff of the institute. The air pollution sources in the university campus are wind, pollen grains, natural dust, vehicular emissions, and laboratory and AC fumes etc. All the pollutants were measured using standard air monitoring methods. The air pollutants monitored on regular basis are sulphur dioxide (SO₂), nitrogen oxide(NO₂), Suspended Particulate Matter (SPM), and Repairable Suspended Particulate Matter (RSPM) etc. Other relevant parameters such as temperature, humidity, pressure, and rainfall are also monitored.

Air quality near the main gate

A. Meteorological Data / Environmental Conditions

- Average wind velocity : 0.98 km/h
- Prominent wind direction : W-E
- Relative Humidity (Max./Min.) : 83/23 %

B. Airquality Report

Parameter	Result	NAAQS #2019
Sulphur Dioxide (SO ₂)	2.7 µg/nm ³	20 µg/m ³ 24-hour mean
Nitrogen Dioxide (NO ₂)	1.8 µg/nm ³	40 µg/m ³ annual mean
Particulate Matter (size less than 10 µm) or PM10	5.0 µg/nm ³	20 µg/m ³ annual mean
Particulate Matter (size less than 2.5µm) or PM2.5	2.6 µg/nm ³	10 µg/m ³ annual mean
Ozone (O ₃)	Negligible	100 µg/m ³ 8-hour mean
Lead	nil	0.50 µg/m ³ annual mean



Carbon Monoxide (CO)	negligible	2 $\mu\text{g}/\text{m}^3$ 8-hour mean
Ammonia (NH ₃)	negligible	100 $\mu\text{g}/\text{m}^3$ annual mean

4.6. Noise Environment

The noise level measurements were carried out using the Noise Level Meter. The noise level survey was carried out at seven locations, both circulation area as well as the study area. The university is 15 kms away from the District Headquarters and 2 kms away from the National Highway and train line. The noise levels monitored in the university campus as well as inside the classroom and found the noise level within the permissible limit.

Sl. No.	Location	Minimum Reading In dB	Maximum Reading In dB	Limits
1	Near Main Gate	26	42	75
2	Near back Gate	18	38	75
3	Inside Class room	32	46	75
4	Outside Class room	27	40	75
5	Inside Library	20	25	75
6	Inside Chemistry lab	22	27	75
7	Inside Computer Centre	20	25	75

4.6.1. Recommendation

- Stand of tall trees should be planted along the front boundary wall to reduce noise and air pollution from the roadside.
- Use proper acoustic in rooms installed with heavy machines. Improved damping for machine vibration and sound.
- A continuous air monitoring system should be procured for measurement of air pollution.

5. Conclusions

There is significant environmental awareness amongst the faculty, staff, students and initiatives taken by them are substantial. The installation of solar panels, paperless work system, composting, besides



environmental awareness course initiated by the administration shows how the campus is going to be a Green Campus. Few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques.

As part of the green audit of the campus, the auditing carried out for monitoring of water, waste, e-waste, greenery, ventilation, illumination, air quality, noise level inside and around the campus has been carried out. It was observed that illumination and ventilation are adequate considering natural light and air velocity present. Noise level in the campus is well within the limit. The green audit report is one of the useful means of demonstrating an organisation's commitment to openness and transparency. To promote continuous improvement, it is recommended to conduct the next green auditing during the year 2021-22.


Er P K Pradhan
Maintenance Engineer


Prof P K Kar
Professor in Chemistry


25/03/22
Prof R K Patigrahi
PIC Civil Works


Prof P K Behera
External Member


Smt Upama Kalo
Registrar


25/03
Prof D Dhupal
Director, IQAC


25/03/22
Vice-Chancellor
V.S.S. University of Technology, Odisha
Burla-768018

GREEN AUDIT REPORT

2021-2022



VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY

ODISHA, BURLA-768018

INDIA



Vice-Chancellor

Veer Surendra Sai University of Technology, Burla

Dist. Sambalpur – 768018, Odisha

vc@vssut.ac.in

From the Desk of Chairperson, IQAC

Veer Surendra Sai University of Technology, Burla, Odisha is conducting the green auditing in 2021-2022 for a sustainable future of the campus. This audit process involved initial interviews with management to clarify policies, activities, records and the co-operation of staff and students in the implementation of mitigation measures. This was followed by staff and student interviews, collection of data through questionnaire, review of records, observation of practices and observable outcomes. Besides, the approach ensured that the management and staff are active participants in the green auditing process at the University. The findings of this report show that the University performs fairly well on sustainability issues and has made possible rectifications on the previous audit recommendations within a year. The University does consider the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the University does perform fairly well, the recommendations in this report highlight many ways in which the University can work to improve its actions and become a more sustainable University.



Summary

Rapid industrialization and urbanization have created several environmental issues which may lead to the ecological crisis. Keeping this in mind it becomes essential to adopt sustainable methods in our day to day activities. VSSUT Burla believes in the same and is striving to address issues related to environmental problems.

The purpose of the green audit is to see that the practices followed in the campus comply with the green policy adopted by the institution. The methodology includes preparation and filling up the questionnaire, physical inspection of the campus, observation and review of the documentation, data analysis, measurements and recommendations. It works on several facets like Water conservation, Tree plantation, and Waste management, use of Alternative energy source etc. The objective of the audit is to evaluate as to which degree the University comply with the same.



1. About the University

The Veer Surendra Sai University of Technology (VSSUT) Odisha was formed vide Orissa Act 9 of 2009 by converting University College of Engineering (UCE), Burla to a non-affiliating unitary University and came into force vide notification of the Industries Department, Government of Odisha in 1st July 2009 (Vide memo No.IV/TTI-33/2009-8553 and 8564 dtd. 10th June 2009). The statutes of VSSUT, Burla 2010 has been approved by the Odisha Government vide Industry Department notification No.V-FE-II-01/2010/8697 dated 21st June 2010. This state government University is also recognized by University Grants Commission (UGC), New Delhi vide UGC letter No. F.9-36/2009(CPP-I) dated 5th Jan 2010. The University is empowered to award degrees as specified by the UGC under section 22 of the UGC Act. The University has been declared eligible to receive central assistance under Section 12B of the UGC Act vide letter F.No. 9-36/2009(CPP-I/PU) dated 8th November 2012.

1.1. Vision of the University

To emerge as an internationally acclaimed technical University to impart futuristic technical education and creation of vibrant research enterprise to create quality engineers and researchers, truly world-class leader and unleashes technological innovations to serve the global society and improve the quality of life.

1.2. Mission of the University

The Veer Surendra Sai University of Technology, Odisha, Burla strives to create values and ethics in its products by inculcating depth and intensity in its education standards and need-based research through

- Participative learning in a cross-cultural environment that promotes the learning beyond the classroom.
- Collaborative partnership with industries and academia within and outside the country in learning and research.



- Encouraging innovative research and consultancy through the active participation and involvement of all faculty members.
- Facilitating technology transfer, innovation and economic development to flow as natural results of research where ever appropriate.
- Expanding curricula to cater broader perspectives.
- Creation of service opportunities for uplift ment of the society at large.

1.3. University Administration

Chancellor	: His Excellency Prof. Ganeshi Lal, Governor of Odisha
Vice-Chancellor	: Prof. Banshidhar Majhi
Registrar	: Shri Pradeep Dang, OAS (S)
Comptroller of Finance	: Sri Tularam Kalet, GFS-1 (SB)S
Director, IQAC	: Prof. Debabrata Dhupal
PIC Civil Maintenance	: Prof. Ramakanta Panigrahi
Maintenance Engineer	: Er. Pratap Kumar Pradhan

1.4. Members of the Board of Management

- Prof. Banshidhar Majhi, Vice-Chancellor, VSSUT, Burla (Ex-officio)
- Principal Secretary to Government of Odisha, Skilled Development & Technical Education Department, Bhubaneswar (Ex-officio)
- The Director, Technical Education & Training, Odisha, (Ex-officio)
- Additional Secretary to Govt. (ES-II) Finance Dept., Govt. of Odisha, BBSR. (Ex-officio)
- Hon'ble Vice-Chancellor, Biju Pattnaik Univ. of Tech., Odisha, Rourkela (Ex-officio)
- Dr. Damodar Acharya, Ex-Director, IIT Kharagpur (AICTE Nominee)
- Prof. Chintamani Mahapatra, Jawaharlal Nehru University, New Delhi (UGC Nominee)



- Prof. Debadutta Mishra, Professor in Prod. Engg., VSSUT, Burla.
- Prof. Prakash Chandra Swain, Professor in Civil Engineering VSSUT, Burla
- Prof. Sidharth Panda, Professor of Electrical Engg. VSSUT, Burla
- Prof. Sanjay Kumar Patro, Professor of Civil Engg. VSSUT, Burla
- Prof. S Karmalkar, Director, IIT, Bhubaneswar (Chancellor's Nominee)
- Er. Ashesh Padhy, VP & Head-Project, JSW Paradip Steel Project (Alumni)
- Prof. Sukumar Mishra, Professor in Electrical Engg., IIT, Delhi (Alumni)
- Shri Debesh Acharya, M.L.A., Bargarh
- Registrar, VSSUT, Burla, Convener-cum-Secretary

2. Overview of the University:

Veer Surendra Sai University of Technology (VSSUT), Burla was established in the year 1956 as UCE, Burla - the first engineering college of the state. The University occupies over 502 acres of prime land in Burla at the foothill of world famous Hirakud dam. It is located at Burla only 10 Km away from the city center of Sambalpur Municipality, and well connected to rest of India through national highway, railway and airway. The University is surrounded by other reputed educational institutes like Sambalpur University, VSS Medical college, IIM Sambalpur, GM University, Odisha State Open University. Apart from this, a large number of public and private sector industries such as MCL, OHPC, HINDALCO, NALCO, NTPC, OPTCL, Vedanta Aluminium Ltd and Bhusan Steel Plant operate in its vicinity.

Over the years, the VSSUT, Burla has carved a niche for itself among the best technical institutes in India, and as dream institute for many budding engineers. The University offers B.Tech., M.Tech., M.Sc., MCA and Doctoral research programmes. True to its reputation, the University has produced over 25,000 graduate engineers, and 5000 post graduate engineers including doctorates. The University has a strong alumni base and most of them have occupied coveted positions in many public offices in India, and educational, industrial and research organizations all over the world.



The University is fully residential with modern amenities and resources. It houses the administrative block cum academic building, auditorium, library, central internet facility, central computing facility, central workshop, e-learning center, innovation cum incubation center, gymkhana, eleven halls of residence for student accommodation, guesthouse and quarters to accommodate the faculty members, officers and staff of this University. Apart from these facilities like dispensary, bank, post office, park, playground, canteen, cafeteria, etc. are available for its residents. New state-of-art computer center, gymkhana, and swimming pool are under construction.

The University follow the philosophy of "learning in the lap of nature". In tune with the above philosophy, more than 60% of the campus is kept green. The University has lush-green landscaped campus with varieties of flowering plants and perennial tree species. The University emphasis on Reduce, Reuse and Recycle of waste to reduce the environment footprint, and to preserve natural resource. The University encourages its students and staffs to adopt a sustainable framework to reduce the carbon footprints.

2.1. Key infrastructures:

Sl. No.	Description	Details	Area/Plinth Area
Land In Use			
1	University		36.5 Acres
2	Hall of Residences		28.0 Acres
3	Staff Quarters		69.1 Acres
4	Free Land		266.77Acres
5	Govt. Land Available for Extension		102.00 Acres
Grand Total			502.37 Acres
Construction details			
1	University Building	Main building of plinth area	1,22,715 sft
2		Workshop plinth area	27858 sft
3		Workshop office	3100 sft



4		High voltage Laboratory	1200 sft
5		Cycle shed	4600 sft
6		Garage	1660 sft
7		Guest House	3120 sft
8		Robotic Club	2700 sft
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50	G.E	10 Nos.	4000 sft
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2.2. Selected Photographs:



Main entrance of Academic campus



Administrative block



Academic Block



Birds eye view of academic block



Library building



Biju Patnaik e-learning center



Entrance gate of a hostel



Central park at hostel



Low cost rammed earth building for coffee center



Landscaping near auditorium



Guest House



Faculty Quarters



3. Objectives of the Green Audit:

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The water audit is an onsite survey and assessment to determine the current usage of water and future need, and to improve the efficiency in its use. The water audit included the water supply, consumption, and appliances and fixtures.

4.1.1. Observations



The University receives 2,00,000 L/day of water from Sambalpur Municipal Corporation through Public Health Department which is used for laboratories, lavatories, gardening and drinking purpose. A well maintained treatment plant is available at the source of water supply. Further, it is mention that for obtaining drinking water number of water purification filters are positioned at different strategic locations of the University campus. During the survey, no loss of water is observed, neither by leakage nor by the overflow of water from the overhead tanks. The data collected from all the departments are examined, and verified. On average, the total use of water in the University is 2,00,000 L/day, which include 90,000 L/day for domestic purposes, 40,000 L/day for gardening and 70,000 L/day for different laboratories. The water used for drinking purpose analyzed as per IS 10500:2012 - drinking water specification and observed to be potable.

The wastewater generated from the Laboratory is stored and treated before disposal. Whereas domestic wastewater is treated in the septic tanks and soak pits.

4.1.2. Drinking water analysis report

A. Organoleptic and Physical Parameters

Sl.	Parameter	Result	Acceptable Limit as per IS 10500:2012
1	Colour (Cobalt Scale) (part 4 of IS 3025)	1 - 2 Unit	5 units
2	Odour (part 5 of IS 3025)	agreeable	agreeable
3	pH Value (part 11 of IS 3025)	7.1 - 7.3	6.5 - 8.5
4	Turbidity	0.3 - 0.5 NTU	1 NTU
5	Total Dissolved Solids(mg/l)	94 - 102 mg/l	500 mg/l
6	Calcium (as Ca) (mg/l)	7 - 12 mg/l	75 mg/l
7	Chloride (as Cl) (mg/l)	11 - 15.5 mg/l	250 mg/l
8	Fluoride (as F) (mg/l)	0.15 - 0.2 mg/l	1.0 mg/l
9	Iron (as Fe) (mg/l)	0.05 - 0.1 mg/l	0.3 mg/l



10	Magnesium (as Mg) (mg/l)	5 - 7 mg/l	30 mg/l
11	Nitrate (as NO ₃) (mg/l)	0.2 – 0.4 mg/l	45 mg/l
12	Sulphate (as SO ₄) (mg/l)	5.5 - 8 mg/l	200 mg/l
13	Total Alkalinity	45 - 50 mg/l	200 mg/l
14	Total Hardness (as CaCO ₃) (mg/l of CaCO ₃)	29 - 32 mg/l	200 mg/l

B. Bacteriological Analysis

Sl.	Parameter	Result	Acceptable Limit as per IS 10500: 2012
15	<i>E.coli</i>	nil	nil
16	Total Coliforms	nil	nil

4.1.3. Recommendations

- Dependency on Municipal Corporation should be reduced. It can be achieved by minimizing the dependency for toilets and gardening.
- Dependency on rainwater harvesting need to be increased.
- Drip/sprinkler irrigation system should be used in gardens for minimizing the water consumption.
- In campus small scale/medium scale/ large scale reuse and recycle of the water system is necessary

4.2. Waste generation and treatment

Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. Therefore, this audit is conducted to addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable waste, glass, dust etc. and their recycling. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair and reuse. The survey focused on volume, type and current practice of solid waste management.



4.2.1. Observations

The total solid waste collected in the campus is around 245 kg/day. Waste generated from canteen and tree droppings is a major solid waste in the campus. The waste is segregated at source by providing separate dustbins for the biodegradable and non-biodegradable waste. The biodegradable wastes generated from mess kitchen, canteen and plant litters were collected and used for composting. The paper wastes especially the cardboards are generally sold to the recyclers. To reduce the paper consumption and paper waste generation the University follows double-sided printing on papers for official purposes. Segregation of chemical waste generated in laboratories is also in practice.

Single-side used papers are reused for writing and printing in all departments. Important and confidential reports/ papers are sent for recycling to authorised recycler department after completion of their preservation period. Complying with government rules plastic has been banned. Metal waste and wooden waste are stored and given to authorized scrap agents for further processing. Glass bottles generated in laboratories are reused. The food waste from canteen and tree droppings is sent to vermin compost. All the laboratories are installed with fire extinguishers for an emergency.

4.3. E-waste Generation

E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life. Although, E-wastes makes up about 5% of all municipal solid waste worldwide but is much more hazardous than other waste because electronic components contain cadmium, lead, mercury and Poly-Chlorinated Biphenyls (PCBs) which are equivalently damaging for human health and environment.

4.3.1. Observations

E-waste generated in the campus is very negligible. The campus has a total of 1028 computers and laptops, 95 printers, 18 Xerox machines, and 29 scanners in working condition. The cartridges of



printers are refilled and reused. The administration conducts awareness programmes regarding e-waste management with the help of various departments. The e-waste and defective item from the computer laboratory are stored properly. These electronic waste material such as computer, computer peripherals, printer, scanner etc., where they can be reused/recycled safely, are handed over to needy organization/department. For the remaining wastes, the institution has decided to contact disposal facility and approved e-waste management for disposing of those wastes scientifically.

4.3.2. Recommendations

- As far as possible electronics instruments from reputed companies, and with a better life span should be purchased.
- E-waste generated at the University should be sent to recycle and reuse.



Solar cell in the University campus

4.4. Land Use and Green area

This includes the available area under construction and open space available for plantation to ensure that the buildings conform to green standards. This helps in ensuring that the Environmental Policy is enacted, enforced and reviewed using various environmental awareness programmes.



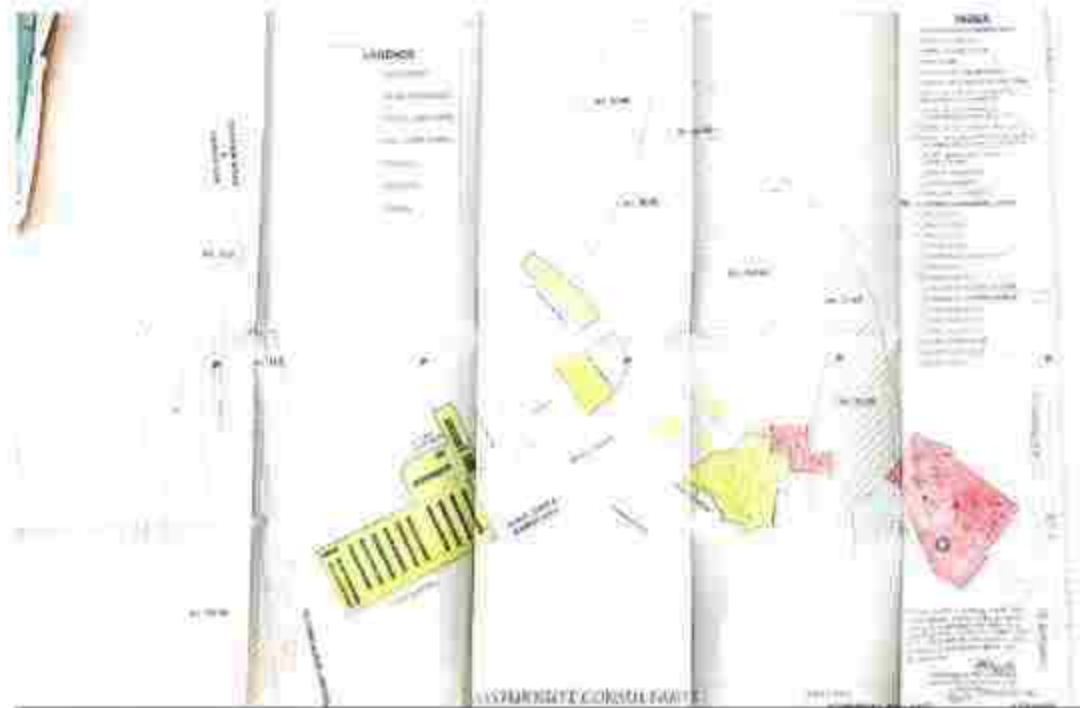
4.4.1. Chart showing Available area and area under construction

Facility	Rooms	Carpet area Sqm.
Large Class Rooms	12	700
Small ClassRooms	69	5824
Laboratories for UG and PG Programs	49	9500
Computer Lab	3	360
Library	1	1265
Workshop	1	1675
Administrative Block	20	3,771
Seminar Hall	6	639

4.4.2. Campus & Built-up Area

- Location : Urban area
- Campus area : 166.48 Acres
- Built-up area in sq.mts : 1,39,964 Sqm.

4.4.3. University Master Plan





4.4.4. Greenery

The University attempts to maintain eco-friendly atmosphere on the campus; the number and variety of plant species help to maintain an eco-friendly ambience. Further, to create eco-friendly awareness among the students, the University arranges special programmes through where the students get clear idea and importance of trees in life. There are several perennial plant species in the campus. University has undertaken various activities like plantation and beautification of campus through various drives.

4.4.5. List of Plants

Sl.No.	Name of the Plant	Habit	Family
1	Terminalia chebula	Tree	Combretaceae
2	Terminalia belerica	Tree	Combretaceae
3	Madhuca longifolia	Tree	Sapotaceae
4	Acacia auriculiformis	Tree	Mimosaceae
5	Anthocephalus Cadamba	Tree	Rubiaceae
6	Alstonia scholaris	Tree	Apocynaceae
7	Hamelia Patens	Shrubs	Rubiaceae
8	Bougainvillea spectabilis	Climbers	Nyctaginaceae
9	Ocimum sanctum	Herb	Lamiaceae
10	Carica papaya	Herb	Caricaceae
11	Cymbopogon citratus	Herb	Poaceae
12	Azadirachta indica	tree	Meliaceae
13	Tectona grandis	tree	Lamiaceae
14	Mangifera indica	tree	Anacardiaceae
15	Ficus benghalensis	tree	Moraceae
16	Millettia pinnata	tree	Fabaceae
17	Syzygium cumini	tree	Myrtaceae
18	Aegle marmelos	tree	Rutaceae
19	Caesalpinia pulcherrima	tree	Fabaceae



20	<i>Peltophorum pterocarpum</i>	tree	Fabaceae
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4.4.6. Selected Photographs of plantation and beautification and cleaning drive





4.4.7. Recommendation

The University has ample green area and has utilized the available space generously in this regards. However, the University could make an understanding with local bodies to contribute to greening the spaces available with the local bodies.

4.5. Environmental Audit

This includes the assessment and monitoring of air quality, and noise levels in around the University.

4.5.1. Air Monitoring

Air quality in the academic institute is very important for the health of the students, faculty and staff of the institute. The air pollution sources in the University campus are wind, pollen grains, natural dust, vehicular emissions, and laboratory and AC fumes etc. All the pollutants were measured using standard air monitoring methods. The air pollutants monitored on regular basis are sulphur dioxide (SO_2), nitrogen oxide (NO_2), Suspended Particulate Matter (SPM), and Respirable Suspended Particulate Matter (RSPM) etc. Other relevant parameters such as temperature, humidity, pressure, and rainfall are also monitored.

Air quality near the main gate

A. Meteorological Data / Environmental Conditions

- Average wind velocity : 0.96 km/h
- Prominent wind direction : W-E
- Relative Humidity (Max./Min.) : 82/22%

B. Air quality Report

Parameter	Result	NAAQS #2019
Sulphur Dioxide (SO_2)	2.6 – 3.2 $\mu\text{g}/\text{nm}^3$	20 $\mu\text{g}/\text{m}^3$ 24-hour mean



Nitrogen Dioxide (NO ₂)	1.6 – 2.2 µg/nm ³	40 µg/m ³ annual mean
Particulate Matter (size less than 10 µm) or PM10	5.2 – 8.2 µg/nm ³	20 µg/m ³ annual mean
Particulate Matter (size less than 2.5µm) or PM2.5	2.6 – 3.8 µg/nm ³	10 µg/m ³ annual mean
Ozone (O ₃)	Negligible	100 µg/m ³ 8-hour mean
Lead	nil	0.50 µg/m ³ annual mean
Carbon Monoxide (CO)	negligible	2 µg/m ³ 8-hour mean
Ammonia (NH ₃)	negligible	100 µg/m ³ annual mean

4.6. Noise Environment

The noise level measurements were carried out using the Noise Level Meter. The noise level survey was carried out at seven locations, both circulation area as well as the study area. The University is 15 kms away from the District Headquarters and 2 kms away from the National Highway and train line. The noise levels monitored in the University campus as well as inside the classroom and found the noise level within the permissible limit.

Sl. No.	Location	Minimum Reading In dB	Maximum Reading In dB	Limits
1	Near Main Gate	24	43	75
2	Near back Gate	17	41	75
3	Inside Class room	30	45	75
4	Outside Class room	25	44	75
5	Inside Library	15	22	75
6	Inside Chemistry lab	21	25	75
7	Inside Computer Centre	22	25	75

4.6.1. Recommendation

- Stand of tall trees should be planted along the front boundary wall to reduce noise and air pollution from the roadside.



- Use proper acoustic in rooms installed with heavy machines. Improve damping for machine vibration and sound.
- A continuous air monitoring system should be procured for measurement of air pollution.

5. Conclusions

There is significant environmental awareness amongst the faculty, staff, students and initiatives taken by them are substantial. The installation of solar panels, paperless work system, composting, besides environmental awareness course initiated by the administration shows how the campus is going to be a Green Campus. Few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques.

As part of the green audit of the campus, the auditing carried out for monitoring of water, waste, e-waste, greenery, ventilation, illumination, air quality, noise level inside and around the campus has been carried out. It was observed that illumination and ventilation are adequate considering natural light and air velocity present. Noise level in the campus is well within the limit. The green audit report is one of the useful means of demonstrating an organisation's commitment to openness and transparency. To promote continuous improvement it is recommended to conduct the next green auditing during the year 2022-23.

(Er. P K Pradhan)

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Green Audit Report

2022-2023



VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY

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From the Desk of Chairperson, IQAC

Veer Surendra Sai University of Technology, Burla, Odisha is conducting the green audit for the year 2022-2023, with the aim of fostering a sustainable future for the campus. The audit process included initial interviews with the management to gain clarity on policies, activities, records, and the involvement of staff and students in implementing mitigation measures. Subsequently, staff and student interviews were conducted, along with data collection through questionnaires, a review of records, observation of practices, and assessment of observable outcomes. Notably, the approach ensured active participation from both management and staff in the university's green audit process. The findings presented in this report indicate that the University demonstrates commendable performance in addressing sustainability issues, successfully implementing rectifications based on previous audit recommendations within a year. The University exhibits a conscientious effort to consider the environmental impacts of its actions and consistently strives to act in an environmentally responsible manner. While the University performs reasonably well in its sustainability endeavors, the recommendations outlined in this report underscore several areas where the institution can enhance its efforts to become a more sustainable university.



Summary

The rapid pace of industrialization and urbanization has given rise to numerous environmental challenges, potentially leading to an ecological crisis. Recognizing this, it becomes imperative to integrate sustainable practices into our daily activities. VSSUT Burla shares this commitment and endeavors to address environmental issues proactively.

The green audit conducted by the university aims to ensure that the campus practices align with the institution's adopted green policy. The methodology involves the completion of questionnaires, physical inspections of the campus, observations, documentation reviews, data analysis, measurements, and subsequent recommendations. The audit focuses on various aspects such as water conservation, tree plantation, waste management, and the utilization of alternative energy sources. Its primary objective is to assess the extent to which the University adheres to the established green policy.



1. About the University

The Veer Surendra Sai University of Technology (VSSUT) Odisha was formed vide Orissa Act 9 of 2009 by converting University College of Engineering (UCE), Burla to a non-affiliating unitary University and came into force vide notification of the Industries Department, Government of Odisha in 1st July 2009 (Vide memo No.IV/TTI-33/2009-8553 and 8564 dtd. 10th June 2009). The statutes of VSSUT, Burla 2010 has been approved by the Odisha Government vide Industry Department notification No.V-FE-II-01/2010/8697 dated 21st June 2010. This state government University is also recognized by University Grants Commission (UGC), New Delhi vide UGC letter No. F.9-36/2009(CPP-I) dated 5th Jan 2010. The University is empowered to award degrees as specified by the UGC under section 22 of the UGC Act. The University has been declared eligible to receive central assistance under Section 12B of the UGC Act vide letter F.No. 9-36/2009(CPP-I/PU) dated 8th November 2012.

1.1. Vision of the University

To emerge as an internationally acclaimed technical University to impart futuristic technical education and creation of vibrant research enterprise to create quality engineers and researchers, truly world-class leader and unleashes technological innovations to serve the global society and improve the quality of life.

1.2. Mission of the University

The Veer Surendra Sai University of Technology, Odisha, Burla strives to create values and ethics in its products by inculcating depth and intensity in its education standards and need-based research through

- Participative learning in a cross-cultural environment that promotes the learning beyond the classroom.
- Collaborative partnership with industries and academia within and outside the country in learning and research.
- Encouraging innovative research and consultancy through the active participation and involvement of all faculty members.



- Facilitating technology transfer, innovation and economic development to flow as natural results of research where ever appropriate.
- Expanding curricula to cater broader perspectives.
- Creation of service opportunities for uplift ment of the society at large.

1.3. University Administration

Chancellor	: His Excellency Prof. Ganesh Lal, Governor of Odisha
Vice-Chancellor	: Prof. Banshidhar Majhi
Registrar	: Shri Pradeep Dang, OAS (S)
Comptroller of Finance	: Sri Tularam Kalet, OFS-1 (SB)S
Director, IQAC	: Prof. Amar Nath Nayak
PIC Civil Maintenance	: Dr. Debabrata Giri
Maintenance Engineer	: Dr. Ramkrishna Dandapat

1.4. Members of the Board of Management

- Prof. Banshidhar Majhi, Vice-Chancellor, VSSUT, Burla (Ex-officio)
- Principal Secretary to Government of Odisha, Skilled Development & Technical Education Department, Bhubaneswar (Ex-officio)
- The Director, Technical Education & Training, Odisha, (Ex-officio)
- Additional Secretary to Govt. (ES-II) Finance Dept., Govt. of Odisha, BBSR. (Ex-officio)
- Hon'ble Vice-Chancellor, Biju Pattnaik Univ. of Tech., Odisha, Rourkela (Ex-officio)
- Dr. Damodar Acharya, Ex-Director, IIT Kharagpur (AICTE Nominee)
- Prof. Chintamani Mahapatra, Jawaharlal Nehru University, New Delhi (UGC Nominee)
- Prof. Debadutta Mishra , Professor in Prod. Engg., VSSUT, Burla.
- Prof. Prakash Chandra Swain, Professor in Civil Engineering VSSUT, Burla
- Prof. Sidharth Panda, Professor of Electrical Engg. VSSUT, Burla
- Prof. Sanjay Kumar Patro, Professor of Civil Engg. VSSUT, Burla



- Prof. S Karmalkar, Director, IIT, Bhubaneswar (Chancellor's Nominee)
- Er. Ashesh Padhy, VP & Head-Project, JSW Paradip Steel Project (Alumni)
- Prof. Sukumar Mishra, Professor in Electrical Engg., IIT, Delhi (Alumni)
- Shri Debesh Acharya, M.L.A., Bargarh
- Registrar, VSSUT, Burla, Convener-cum-Secretary

2. Overview of the University:

Veer Surendra Sai University of Technology (VSSUT), Burla was established in the year 1956 as UCE, Burla - the first engineering college of the state. It is located at Burla only 10 Km away from the city center of Sambalpur Municipality, and well connected to rest of India through national highway, railway and airway. With excellent connectivity through national highways, railways, and airways, it enjoys proximity to various educational institutions like Sambalpur University, VSS Medical College, IIM Sambalpur, GM University, and Odisha State Open University. Additionally, it is surrounded by numerous public and private sector industries, including MCL, OHPC, HINDALCO, NALCO, NTPC, OPTCL, Vedanta Aluminium Ltd, and Bhusan Steel Plant.

VSSUT, Burla has emerged over the years as one of the premier technical institutes in India, attracting aspiring engineers. Offering a range of programs such as B.Tech., M.Tech., M.Sc., MCA, and doctoral research, the university boasts a strong track record, producing over 25,000 graduate engineers and 5,000 postgraduate engineers, including doctorates. Its alumni hold esteemed positions in public offices across India, as well as in educational, industrial, and research organizations worldwide.

The university is fully residential, equipped with modern amenities and resources, including administrative and academic buildings, an auditorium, library, central internet and computing facilities, workshop, e-learning center, innovation cum incubation center, gymkhana, halls of residence, guesthouse, and faculty accommodations. Additional facilities like a dispensary, bank, post office, park, playground, canteen, and cafeteria cater to the needs of residents, while new state-of-the-art facilities such as a computer center, gymkhana, and swimming pool are recently constructed.



Adhering to the philosophy of 'learning in the lap of nature,' more than 60% of the campus is dedicated to green spaces, featuring lush landscapes with a variety of flowering plants and perennial trees. The university places emphasis on reducing, reusing, and recycling waste to minimize environmental impact and preserve natural resources. Encouraging students and staff to adopt a sustainable framework, the university strives to minimize carbon footprints.

2.1. Key infrastructures:

Sl. No.	Description	Details	Area/Plinth Area
Land In Use			
1	University		36.5 Acres
2	Hall of Residences		28.0 Acres
3	Staff Quarters		69.1 Acres
4	Free Land		266.77 Acres
5	Govt. Land Available for Extension		102.00 Acres
Grand Total			502.37 Acres
Construction details			
1	University Building	Main building of plinth area	1,22,715 sft
2		Workshop plinth area	27858 sft
3		Workshop office	3100 sft
4		High voltage Laboratory	1200 sft
5		Cycle shed	4600 sft
6		Garage	1660 sft
7		Guest House	3120 sft
8		Robone Club	2700 sft
9		Auditorium	14850 sft
10		N.C.C. Building	6000 sft
11		Gymnasium	3300 sft
12		Athletic Building	1730 sft
13		Maintenance office	3200 sft
14		Dispensary	2560 sft
15		Computer Science & Engg. Building	19010 sft
16		Workshop Extension	2610 sft



17		Hydraulics Laboratory extension	1140 sft
18		Cycle sheds	2120 sft
19		Library Building	14050 sft
20		Administrative Building	8530 sft
21		Extension of Electrical & ELTCE Building	2880 sft
22		Innovation and Incubation centre	15629 sft
23		Community centre	2700 sft
Total			267262 sft.
23	Halls of Residence	Atni Hall (Boys)	47260 sft
24		Kratu Hall (Boys)	47260 sft
25		Vasistha Hall (Boys)	47260 sft
26		Marichi Hall (Boys)	47260 sft
27		Pulastya Hall (Boys)	47260 sft.
28		Pulaha Hall (Boys)	363620 sft.
28		Arigira Hall (Girls)	24160 sft.
29		Arundhati Hall (Girls)	58100 sft
30		Anuradha Hall (Girls)	35000 sft.
31		Visakha Hall (Girls)	35000 sft.
32		Rohini Hall (For Girls)	35000 sft.
			Total
Details of Staff Quarters			
33	A-1 Bungalow	1 No.	4725 sft
34	C	4 Nos.	12352 sft
35	D/TD	11 Nos.	15400 sft
36	E	18 Nos.	20880 sft
37	F	100 Nos.	88000 sft
38	G	29 Nos.	13050 sft
39	RS	7 Nos.	3805 sft
40	4R	5 Nos.	9750 sft
41	F4R	4 Nos.	7320 sft
42	M4R	4 Nos.	7200 sft



43	5R	6 Nos.	11220 sft
44	3R	27 Nos.	29750 sft
45	F 3R	8 Nos.	8448 sft
46	Modified E	4 Nos.	3280 sft
47	E(New)	4 Nos.	2640 sft
48	B.F	2 Nos.	1720 sft
49	B.F	14 Nos.	10640 sft
50	G-E	10 Nos.	4000 sft
Total			2,54,180 sft

2.2. Selected Photographs:



Academic campus



Main entrance of Academic campus



Academic Block



Birds eye view of academic block



Library building



Biju Patnaik e-learning center



Entrance gate of a hostel



Central park at hostel



Low cost rammed earth building for coffee
center



Landscaping near auditorium



Guest House



Faculty Quarters



Road through academic block



Garden

3. Objectives of the Green Audit:

The purpose of the green audit is to encourage environmental management and conservation within the University campus and its vicinity. Additionally, the audit seeks to identify, quantify, describe, and prioritize the framework for environmental sustainability, ensuring alignment with relevant regulations, policies, and standards. The main objectives of carrying out Green Audit are:

- To introduce and make students aware of real concerns of the environment and its sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use on the campus.
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections require high cost.
- To bring out a status report on environmental compliance.



3.1. Methodology

The audit was carried out by questionnaire, physical inspection, observation and review of documentation, interviewing key persons. The major topics focused in the audits report are the management of Water, Waste, and Greeneries in, and around the University campus.

4. Outcomes

4.1. Water audit

The water audit is an onsite survey and assessment to determine the current usage of water and future need, and to improve the efficiency in its use. The water audit included the water supply, consumption, and appliances and fixtures.

4.1.1. Observations

The University obtains a daily water supply of 2,50,000 liters from the Sambalpur Municipal Corporation through the Public Health Department, serving various purposes such as laboratory activities, lavatories, gardening, and drinking. A well-maintained treatment plant is situated at the water supply source. Additionally, multiple water purification filters are suitably placed throughout the University campus to ensure the availability of safe drinking water. The survey revealed no water loss due to leakage or overflow from overhead tanks. The collected data from all departments have been thoroughly examined and verified.

The University's overall water consumption averages 2,50,000 liters per day, with 120,000 liters allocated for domestic use, 50,000 liters for gardening, and 80,000 liters for various laboratories. The water designated for drinking purposes complies with IS 10500:2012 - drinking water specifications and is deemed potable.

Wastewater generated in laboratories undergoes storage and treatment before disposal, while domestic wastewater is treated in septic tanks and soak pits.

4.1.2. Drinking water analysis report

A. Organoleptic and Physical Parameters



Sl.	Parameter	Result	Acceptable Limit as per IS 10500:2012
1	Colour (Cobalt Scale) (part 4 of IS 3025)	2 - 8 Unit	5 units
2	Odour (part 5 of IS 3025)	agreeable	agreeable
3	pH Value (part 11 of IS 3025)	6.9 - 7.4	6.5 - 8.5
4	Turbidity	0.2 - 0.7 NTU	1 NTU
5	Total Dissolved Solids(mg/l)	104 - 122 mg/l	500 mg/l
6	Calcium (as Ca) (mg/l)	10 - 14 mg/l	75 mg/l
7	Chloride (as Cl) (mg/l)	10 - 17 mg/l	250 mg/l
8	Fluoride (as F) (mg/l)	0.2 - 0.3 mg/l	1.0 mg/l
9	Iron (as Fe) (mg/l)	0.05 - 0.1 mg/l	0.3 mg/l
10	Magnesium (as Mg) (mg/l)	7 - 10 mg/l	30 mg/l
11	Nitrate (as NO ₃) (mg/l)	1.0 - 2.4 mg/l	45 mg/l
12	Sulphate (as SO ₄) (mg/l)	9 - 18 mg/l	200 mg/l
13	Total Alkalinity	50 - 70 mg/l	200 mg/l
14	Total Hardness (mg/l of CaCO ₃)	32 - 36 mg/l	200 mg/l

B. Bacteriological Analysis

Sl.	Parameter	Result	Acceptable Limit as per IS 10500: 2012
15	<i>E.coli</i>	nil	nil
16	Total Coliforms	nil	nil

4.1.3. Recommendations

- Dependency on Municipal Corporation should be reduced. It can be achieved by minimizing the dependency for toilets and gardening.
- Dependency on rainwater harvesting need to be increased.
- Drip/sprinkler irrigation system should be used in gardens for minimizing the water consumption.
- In campus small scale/medium scale/ large scale reuse and recycle of the water system is necessary

4.2. Waste generation and treatment



The generation and management of solid waste pose a critical concern, and the improper handling of such waste can pose threats to all. Hence, this audit is conducted to address the production and disposal of various types of waste, including paper, food, plastic, biodegradable waste, glass, dust, etc., and to explore recycling methods. Additionally, solid waste often contains valuable material resources that could be more effectively utilized through recycling, repair, and reuse. The survey specifically concentrates on the volume, types, and current practices of solid waste management. Solid waste generation and management is a burning issue.

4.2.1. Observations

The total solid waste collected on the campus amounts to approximately 250 kg per day. The predominant sources of solid waste in the campus are the waste generated from the canteen and tree droppings. To address this, the waste is segregated at its source through the provision of separate dustbins for biodegradable and non-biodegradable waste.

Biodegradable waste, originating from the mess kitchen, canteen, and plant litters, is collected and utilized for composting. Paper waste, particularly cardboard, is typically sold to recyclers. In an effort to reduce paper consumption and waste generation, the University adopts double-sided printing for official purposes. Chemical waste generated in laboratories is also subject to segregation.

Single-sided used papers find a second purpose for writing and printing across all departments. Important and confidential reports papers are sent for recycling to authorized recycling departments once their preservation period concludes. In adherence to government regulations, the use of plastic has been prohibited. Metal and wooden waste are stored and provided to authorized scrap agents for further processing. Glass bottles generated in laboratories are reused, and food waste from the canteen and tree droppings is directed to vermin compost. All laboratories are equipped with fire extinguishers for emergency situations.

4.3. E-waste Generation

E-waste refers to consumer and business electronic equipment that is either nearing or at the end of its useful life. Despite constituting approximately 5% of all municipal solid waste globally, e-waste is considered significantly more hazardous than other types of waste. This heightened risk is attributed to the presence of substances such as cadmium, lead, mercury, and Poly-Chlorinated



Biphenyls (PCBs) within electronic components. These elements pose substantial threats to both human health and the environment.

4.3.1. Observations

The generation of e-waste within the campus is minimal. The campus currently operates with a total of 1050 computers and laptops, 107 printers, 19 Xerox machines, and 32 scanners that are in working condition. To promote sustainability, the cartridges of printers are refilled and reused. The administration actively conducts awareness programs on e-waste management in collaboration with various departments.

Efforts are made to handle e-waste and defective items from the computer laboratory responsibly. Materials such as computers, computer peripherals, printers, scanners, etc., that can be safely reused or recycled are handed over to needy organizations or departments. For the remaining e-waste, the institution has chosen to engage with a disposal facility that adheres to approved e-waste management practices, ensuring the scientific disposal of such waste.

4.3.2. Recommendations

- As far as possible electronics instruments from reputed companies, and with a better life span should be purchased.
- E-waste generated at the University should be sent to recycle and reuse.



Solar cell in the University campus

4.4. Land Use and Green area



This includes the available area under construction and open space available for plantation to ensure that the buildings conform to green standards. This helps in ensuring that the Environmental Policy is enacted, enforced and reviewed using various environmental awareness programmes.

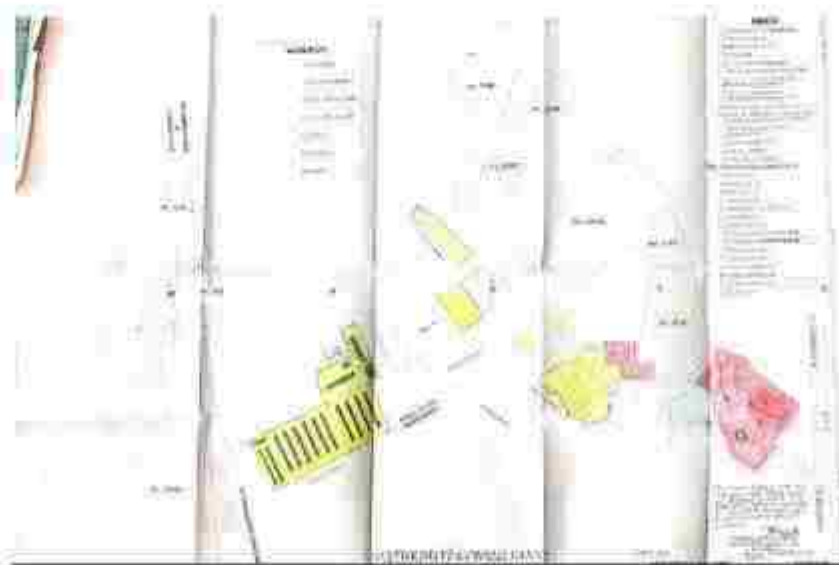
4.4.1. Chart showing Available area and area under construction

Facility	Rooms	Carpet area Sqm.
Large Class Rooms	12	700
Small Class Rooms	69	5824
Laboratories for UG and PG Programs	49	9500
Computer Lab	8	360
Library	1	1265
Workshop	1	1675
Administrative Block	20	3,771
Seminar Hall	6	639

4.4.2. Campus & Built-up Area

- Location : Urban area
- Campus area : 166.48 Acres
- Built-up area in sq.mts : 1,89,964 Sqm.

4.4.3. University Master Plan



4.4.4. Greenery



The University attempts to maintain eco-friendly atmosphere on the campus; the number and variety of plant species help to maintain an eco-friendly ambience. Further, to create eco-friendly awareness among the students, the University arranges special programmes through where the students get clear idea and importance of trees in life. There are several perennial plant species in the campus. University has undertaken various activities like plantation and beautification of campus through various drives.

4.4.5. List of Plants

Sl.No.	Name of the Plant	Habit	Family
1	Terminalia chebula	Tree	Combretaceae
2	Terminalia bellerica	Tree	Combretaceae
3	Madhuca longifolia	Tree	Sapotaceae
4	Acacia auriculiformis	Tree	Mimosaceae
5	Anthocephalus Cadamba	Tree	Rubiaceae
6	Alstonia scholaris	Tree	Apocynaceae
7	Hamelia Patens	Shrubs	Rubiaceae
8	Bougainvillea spectabilis	Climbers	Nyctaginaceae
9	Ocimum sanctum	Herb	Lamiaceae
10	Carica papaya	Herb	Caricaceae
11	Cymbopogon citratus	Herb	Poaceae
12	Azadirachta indica	tree	Meliaceae
13	Tectona grandis	tree	Lamiaceae
14	Mangifera indica	tree	Anacardiaceae
15	Ficus benghalensis	tree	Moraceae
16	Millettia pinnata	tree	Fabaceae
17	Syzygium cumini	tree	Myrtaceae
18	Aegle marmelos	tree	Rutaceae
19	Caesalpinia pulcherrima	tree	Fabaceae
20	Peltophorum pterocarpum	tree	Fabaceae

4.4.6. Selected Photographs of plantation and beautification and cleaning drive



4.4.7. Recommendation

The University has ample green area and has utilized the available space generously in this regards. However, the University could make an understanding with local bodies to contribute to greening the spaces available with the local bodies.

4.5. Environmental Audit



This includes the assessment and monitoring of air quality, and noise levels in around the University.

4.5.1. Air Monitoring

Air quality in the academic institute is very important for the health of the students, faculty and staff of the institute. The air pollution sources in the University campus are wind, pollen grains, natural dust, vehicular emissions, and laboratory and AC fumes etc. All the pollutants were measured using standard air monitoring methods. The air pollutants monitored on regular basis are sulphur dioxide (SO₂), nitrogen oxide (NO_x), Suspended Particulate Matter (SPM), and Repairable Suspended Particulate Matter (RSPM) etc. Other relevant parameters such as temperature, humidity, pressure, and rainfall are also monitored.

Air quality near the main gate

A. Meteorological Data / Environmental Conditions

- Average wind velocity : 1.02 km/h
- Prominent wind direction : W-E
- Relative Humidity (Max./Min.) : 80/21 %

B. Air quality Report

Parameter	Result	NAAQS #2019
Sulphur Dioxide (SO ₂)	2.5 - 3.4 µg/nm ³	20 µg/m ³ 24-hour mean
Nitrogen Dioxide (NO ₂)	1.8 - 2.4 µg/nm ³	40 µg/m ³ annual mean
Particulate Matter (size less than 10 µm) or PM10	5.4 - 8.5 µg/nm ³	20 µg/m ³ annual mean
Particulate Matter (size less than 2.5µm) or PM2.5	3.6 - 5.8 µg/nm ³	10 µg/m ³ annual mean
Ozone (O ₃)	Negligible	100 µg/m ³ 8-hour mean
Lead	nil	0.50 µg/m ³ annual mean
Carbon Monoxide (CO)	negligible	2 µg/m ³ 8-hour mean
Ammonia (NH ₃)	negligible	100 µg/m ³ annual mean

4.6. Noise Environment



The noise level measurements were carried out using the Noise Level Meter. The noise level survey was carried out at seven locations, both circulation area as well as the study area. The University is 15 kms away from the District Headquarters and 2 kms away from the National Highway and train line. The noise levels monitored in the University campus as well as inside the classroom and found the noise level within the permissible limit.

Sl. No.	Location	Minimum Reading In dB	Maximum Reading In dB	Limits
1	Near Main Gate	25	45	75
2	Near back Gate	20	43	75
3	Inside Class room	28	46	75
4	Outside Class room	28	45	75
5	Inside Library	18	21	75
6	Inside Chemistry lab	22	27	75
7	Inside Computer Centre	24	28	75

4.6.1. Recommendation

- Stand of tall trees should be planted along the front boundary wall to reduce noise and air pollution from the roadside.
- Use proper acoustic in rooms installed with heavy machines. Improve damping for machine vibration and sound.
- A continuous air monitoring system should be procured for measurement of air pollution.

4.7. Rain Water Harvesting

Rainwater harvesting involves collecting and storing rainwater for later use. It is an eco-friendly and sustainable method that can be implemented on various scales, from individual households to large institutions like universities. The university has implemented rainwater harvesting systems on its buildings or infrastructure. Gutters and downspouts are used to direct rainwater from the collection surfaces to storage facilities. Rainwater is stored in storage. The size of the storage facility is sufficient considering the intensity of rainfall. Rainwater undergoes filtration to remove debris and contaminants before storage. Harvested rainwater is used for irrigation.



harvesting systems on some portion of the buildings in the first phase. Gutters and downspouts are used to direct rainwater from the collection surfaces to storage facilities. Rainwater is stored in storage. The size of the storage facility is sufficient considering the intensity of rainfall. Rainwater undergoes filtration to remove debris and contaminants before storage. Harvested rainwater is used for irrigation. The detailed design aspects are given below.



Main building roof area	84650 sft
Computer Science & Engg. Building roof area	13000 sft
Library Building roof area	9700 sft
Administrative Building roof area	6000 sft
Extension of Electrical & ELTCE Building roof area	2000 sft
Total roof area of University Building where RWH can be implemented =	115350 sft.
Total roof area of University Building where RWH is implemented in first phase =	18000 sft.
% of rainwater collected =	15.6%

The RWH is done in (i) Administrative Building and (ii) B-block (Main building) in First Phase.

Avg Rainfall considered = 100 mm for 3 days. Runoff coefficient considered = 0.8 for roofed area

1. Area of Administrative Building = 6000 sqft = 558 m²

Volume of water will be received is = 558 × 100mm × 0.8 = 44.640 m³

Adopting a further loss over the time period of 3 days is 40%. So a water storage over a period of 3 days will be = 44.640 × 0.6 = 26.784 m³

Where as the tank is designed for 44.64 m³.

Height of tank = 2.85 m ∴ (2.60m + 0.15m is freeboard)



Area of the base = $44.640 / 2.85 = 15.66 \text{ m}^2 = 16 \text{ m}^2$

Overall Dimension = (2.85m × 8m × 2m) ∴ (height × length × width)

2. Area of B Block = 12000 sqft = 1115 m²

Volume of water will be received is = $1115 \times 100 \times 0.8 = 89.200 \text{ m}^3$

Water storage over a period of 3 days will be of 40% loss. Which will be = $89.2 \times 0.6 = 53.52 \text{ m}^3$

Height of tank = 2.85 m ∴ (2.60m + 0.15m is freeboard)

Area of the base = $89.200 / 2.85 = 31.30 \text{ m}^2 = 31 \text{ m}^2$

Overall Dimension = (2.85m × 8m × 4m) ∴ (height × length × width)

The expenditure for the same is Rs. 4,99,770/-.

4.8. Water Conservation

A sensor-based water level detector is implemented in Rohini Hall of Residence as shown in figure below. It has the following advantages:

1. The overflow from overhead tank reduced.
2. Unnecessary wastage of water due to tap left open after end of storage and filling is minimized.
3. Due to saving of overflow or misuse the filling time of tank has reduced. The energy used for pumping of water to overhead tank is reduced.
4. Manpower for operation of valves and checking of filling of tanks is minimized.



Sensor inside the overhead tank



Control Circuit in the pump house

Expenditure: Total expenditure is Rs. 22,684.

Single Phase Pump Sensor: Rs. 6,990

14/38 Four Core Wire: Rs. 10,884

Single Phase 25a Electrical Contractor: Rs. 2,360

Installation: Rs. 2,950



The campus community, including faculty, staff, and students, exhibits a noteworthy level of environmental awareness, and their proactive initiatives make a substantial impact. Implementations such as the installation of solar panels, the adoption of a paperless work system, and composting, along with the introduction of an environmental awareness course by the administration, reflect the campus's progression towards becoming a Green Campus. Several recommendations are also suggested to address waste management issues using eco-friendly and scientific techniques.

As part of the green audit, a comprehensive evaluation of water usage, waste management, e-waste handling, greenery, ventilation, illumination, air quality, and noise levels both within and around the campus has been conducted. It was observed that lighting and ventilation are adequate, taking advantage of natural light and air. The noise level on the campus is well within acceptable limits.

The green audit report serves as a valuable tool to showcase the organization's commitment to transparency and openness. To encourage continuous improvement, it is recommended to conduct the next green audit during the year 2023-24. This will further contribute to the ongoing efforts towards sustainability and environmental responsibility on the campus.

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