



## **Environment and Green Audit**

# **JC BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY YMCA- FARIDABAD**

**Audit Conducted By: EM Project Services**

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## **Executive Summary**

A nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with environment. A clean and healthy environment aids effective learning and provides a conducive learning environment. Educational institutions now a day are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly. To preserve the environment within the campus, various viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc. The activities pursued by university can also create a variety of adverse environmental impacts.

**Environmental auditing** is a process whereby an organisation's environmental performance is tested against its environmental policies and objectives.

Green audit is defined as an official examination of the effects a university has on the environment. As a part of such practice, internal environmental audit (Green Audit) is conducted to evaluate the actual scenario at the campus.

Green audit can be a useful tool for a university to determine how and where they are using the most energy or water or resources; the university can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. Green auditing and the implementation of mitigation measures is a win-win situation for all the university, the learners and the planet. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. Green auditing promote financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers.

If self enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the university evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

In JC BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY-YMCA the 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 interviews, review of records, observation of practices and observable outcomes. In addition, the approach ensured that the management and staff are active participants in the green auditing process in the university.

The baseline data prepared for the JC BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY-YMCA will be a useful tool for campus greening, resource management, planning of future projects, and a document for implementation of sustainable development of the university. Existing data will allow the university to compare its programmes and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects. We expect that the management will be committed to implement the green audit recommendations.

Water is a very precious commodity and merely by un-restricted drawing of water from bore wells and its very low subsidized tariff from municipal authority is a main impediment in water conservation in India.

Though, water is renewable and is replenished through water cycle but increasing population and industrial requirement are posing a very serious threat on availability of water for all on the Earth.

It is excellent that the management of JC BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY-YMCA and other staff has great respect for sustainable living and are always acting at the right time for remedial measures for protection of Environment and ultimately caring for Society by reduction of resource use.

The Mantra followed is ***REDUCE-REUSE AND RECYCLE***.

## **General Recommendations**

- ❖ Display of Waste management and Green initiative Policy at following prominent locations inside the premises.
  - a. Near main gate
  - b. At main entrance of Administrative Building
  - c. All Hostels/Mess
  - d. Academic Blocks
  - e. Auditorium
  - f. Canteen/Cafeteria.
- ❖ Signage for Tobacco free campus be displayed at prominent locations in campus.
- ❖ Signage for Food wastage be displayed at important locations of Canteen/Messes and Cafeteria in campus.
- ❖ Signage for Water conservation be displayed at important locations in campus.
- ❖ Signage for plastic free campus
- ❖ Signage for Segregation of waste.
- ❖ Provision of different dust bins as a set at a common location.
- ❖ Stack Height of DG set exhaust is not as per CPCB requirement.
- ❖ Height of fume exhaust in chemistry lab is not proper. It should be discharged above building height. Presently fumes are dispersing around building affecting local environment.
- ❖ Lights were found switched on in un occupied area.
- ❖ In efficient Tube Lights of 40Watts/36 Watts have been used.-More impact on environment. Additional CO<sub>2</sub> foot print. It is detrimental for environment.

## **Introduction**

### **VISION**

JC BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY- YMCA- envision itself as a pace-setting university of Academic Excellence focused on education, research and development in established and emerging professions.

**WASTE MANAGEMENT AND GREEN INITIATIVE POLICY - JC  
BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY  
UNIVERSITY-YMCA FARIDABAD**

**POLICY  
ON  
WASTE MANAGEMENT AND  
GREEN INITIATIVES**



**J.C. BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY,  
YMCA, FARIDABAD**

*(Formerly YMCA University of Science and Technology)*

NAAC 'A' Grade accredited State University

Sector-06, Delhi Mathura Road, Faridabad -121006 (Haryana)



*Approved in 37th EC Meeting dated 22/04/2020*

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*Approved in 37th EC Meeting dated 23/04/2020*



## 1 PREAMBLE

The policy on 'Waste Management and Green Initiatives' formulated in response to University's commitment to clean environment. The University realizes the need of sustainable and circular approach essential in reducing its ecological footprint and providing a safe and healthy work environment for teaching and non-teaching employees, students and surroundings.

The University has a responsibility to ensure that the campus wastes are disposed through proper waste segregation at source and if possible, converting those into value added eco-friendly products. Furthermore, it is realized that suitable eco-friendly practices/technologies should be adopted for reducing the environmental impacts of human activities. This would be in line with the Sustainable Development Goals (SDGs) as well as Environmental laws and legislations laid by the government.

The purpose of this policy is to establish objectives and targets, provide the context for suitable action plans and facilitate their implementation. These shall revolve around the 4Rs (Reduce, Reuse, Recycle and Recover) aspect of waste management focussed on campus waste, in addition to their minimization, environmentally sound management and active promotion of green initiatives through community engagement.

The policy inter alia takes cognizance of the various environmental regulations such as The Air Act, Water Act, Environmental Protection Act and the National Environmental Policy of 2006 along with different rules framed by the State and Central Government from time to time.

## 2 POLICY STATEMENT

The University recognizes the need for protection of the natural environment within the built environment and incorporates it as an integral part of good institutional practices. To achieve this, the university shall develop, implement and sustain an Environment Management System which would lead to sustainable development and advance positive effects on both human health and the natural environment for university community and the surroundings.

- 1) The University will adopt the principles of best environmental practices as reasonably possible in the delivery of its waste management services and ecological initiatives.





- 2) The University will apply a 'waste hierarchical approach', to reduce, reuse, recycle and recover waste products to manage its waste responsibly, reduce the volume of waste sent to landfill and maximise reuse and recycling where possible.
- 3) The University will promote water conservation and energy use efficiencies through effective programs and practices. The university will undertake possible efforts to reduce environmental footprints from university related activities via use of cleaner and eco-friendly practices/technologies.
- 4) The University recognizes the importance of compliance with applicable environmental laws and regulations as laid down by the government.
- 5) The University will review the environmental objectives and targets from time to time in order to minimize resource consumption and improve environmental performance.
- 6) The University will communicate this policy to every stakeholder.
- 7) The University requires that all the employees, students or anyone else making use of the premises comply with the environmental objectives set in the policy and associated Environmental Management System for upholding the spirit of the document and ensure compliance with all environmental legislations.

### 3 POLICY OBJECTIVES

The objectives of this policy are to:

- 1) Promote holistic approach of waste management, resource conservation and green initiatives at the university campus.
- 2) Ensure that waste management is performed at university campus in line with all waste legislative requirements.
- 3) Encourage judicious use of environmental resources to meet the needs and aspirations of the present and future generations.
- 4) Provide clearly defined roles and responsibilities to identify and coordinate each activity related to waste management and green initiatives.
- 5) Disseminate environmental awareness among students and staff members.



## 4 ORGANISATION AND MANAGEMENT

The responsibilities and management for the 'Waste Management and Green Initiatives Policy' are shared among variety of personnel within the University. The structure shall be as provided in the succeeding sections.

### 4.1 Advisory Board

An advisory board shall be constituted with the following organization structure:

- 1) Vice-Chancellor - Chairman
- 2) Registrar
- 3) Two Deans (to be nominated by the Vice-chancellor)
- 4) Chairperson (Department of Environmental Sciences)
- 5) Two Faculty member from Sciences Department (to be nominated by the Vice-chancellor)
- 6) Two Faculty members from Engineering Departments (to be nominated by the Vice-chancellor)
- 7) Two Faculty members from Management/Humanities Departments (to be nominated by the Vice-chancellor)
- 8) Executive Engineer
- 9) Two Outside Experts (need based) (to be nominated by the Vice-chancellor)
- 10) Coordinator -Member Secretary (to be nominated by the Vice-chancellor)

### 4.2 Functions of the Advisory Board

The advisory board shall assume office on the date of publishing this document with the following roles:

- 1) Abide by this Policy Document in value and spirit.
- 2) Advise and coordinate the provision laid in the Campus Waste Management and Green Initiatives at the campus.
- 3) Guide and provide directions to the implementation of initiatives for environmental conservation in the field of waste, water and energy.
- 4) Ensure that all stakeholders are advised that they must comply with the University's Waste Management and Green Initiatives Policy.



- 5) Set up a Green Cell of the University for monitoring and supervising the activity components of the policy document.

#### 4.3 Responsibilities

##### A) Heads of Departments/Directors/Section In-charge

They shall have the following responsibilities

- 1) Abide by this policy document in value and spirit
- 2) Ensure that waste is disposed responsibly in their premises through the appropriate waste disposal system (such as segregation of waste and 4Rs), in accordance with University policy and procedures.
- 3) Ensure that all stakeholders in their respective department are aware of the procedures/practices about waste management and green initiatives formulated in the policy.

##### B) Students/Staff members:

- 1) Abide by this policy document of the University in value and spirit.
- 2) Dispose the waste responsibly (at both office and residence), through the appropriate waste disposal system (segregation of waste), in accordance with University policy and procedures.
- 3) Promote peer to peer understanding and appreciation of natural environment
- 4) Report any challenges or problems in implementation of waste management and green initiatives to the Head of Department.

## 5 POLICY FOR WASTE MANAGEMENT

### 5.1 Solid Waste Management

The University shall apply a 'Waste Hierarchical Approach', to reduce, reuse, recycle and recover waste products to manage its waste responsibly, reduce the volume of waste sent to landfill and maximise reuse and recycling where possible.

#### Action Plan:

- 1) **Waste Avoidance and Minimization** - In the hierarchy of waste management, waste avoidance and waste minimization have to be attempted first, for which dissemination of information on technological options should be a continuing exercise.



- 2) **Segregation of Solid Waste at Source** - Waste generators would have to segregate waste into two streams – Biodegradable and Dry waste (Plastic, Paper, metal, Wood, etc.) before handing it over to the collector as mentioned in Solid Waste Management Rules, 2016 laid by Government of India.
- 3) **Reuse and Recycling** - The recyclable material like plastic, tin, glass, paper and others should be handed over either to authorised waste-pickers and recyclers or to the urban local body.
- 4) **Solid Waste Processing and Disposal** - It is advised that the bio-degradable waste should be processed, treated and disposed of through composting or any other suitable process/technology within the premises as far as practically possible and the non-biodegradable wastes shall be disposed through a responsible waste collector or agency as directed by the local authority.

## 5.2 Water and Wastewater Management

The university shall undertake its best efforts for;

- 1) Conserve water through efficient fixtures as well as adopt rain water harvesting.
- 2) Minimise wastage of water in campus.
- 3) Treat or dispose wastewater originating from university activities in a sustainable manner as per applicable guidelines by CGWA and NGT.
- 4) Ensure that the treated effluent may be recycled for irrigation and other purposes.

### Action Plan for Liquid Waste Management:

The Liquid waste from the campus consists mainly of domestic sewage from different establishments within the campus. A techno-economic feasibility study can be initiated for arriving at an appropriate solution for establishing Sewage Treatment Plants (STPs). The effluent water can be utilised for landscaping and non-potable use.

## 5.3 E-waste/Hazardous waste/Biomedical Waste Management

The e-waste/Hazardous waste/Biomedical Waste originating at university premises shall be managed as per the policy or regulations laid down by Central and state government such as E-Waste Management Rules 2016, Hazardous and Other Wastes (Management and Trans boundary) Rules 2016 and Biomedical Waste Management Rules, 2016.



**Action Plan:**

- 1) All the departments may be required to carry out an inventorisation of items which could possibly be classified in e-waste in the next 3, 6 and 12 months from the date of current usage.
- 2) An e-waste collection centre may be established for obtaining e-waste from different departments.
- 3) Suitable authorised vendors by the Central Pollution Control Board and willing to offload the e-waste from the campus would be invited for an auction of the e-waste.

## **6 GREEN INITIATIVES AT UNIVERSITY PREMISES**

### **6.1 Green Audit**

The university shall make arrangements to undertake a comprehensive Green Audit of the existing structures and work operations annually to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

The objective of the green audit is to improve energy and water usage efficiency, better waste management and all round management and development of campus in eco-friendly manner for sustainable future.

The Green audit may consist of following broad points:

- 1) **Water audit** – water balance consisting of source, consumption and recycling.
- 2) **Waste audit** – inventorisation of municipal solid waste, hazardous wastes, biomedical wastes and sources thereof, compostable fraction of wastes, segregation of wastes, present practice on waste management inside campus.
- 3) **Energy audit**- inventorisation of electrical fittings, fixtures, appliances, machines, etc., energy consumption, recognise energy wastage and leakage points.
- 4) **Biodiversity** – green cover mapping, tree counting, biodiversity register.

### **6.2 Green Master Plan**

Since there is a need to augment the infrastructure on the campus, it becomes equally critical to ensure that the master plan is compliant with environmental norms and/or at least, GEM (ASSOCHAM)/IGBC/GRIHA compliant. The upcoming infrastructure and facilities as well as additions to the existing structures and facilities should be developed



with a focus on energy efficiency, minimizing waste generation, optimizing power consumption of power, water and other supplies.

### 6.3 Energy conservation

The university will do maximum efforts to reduce energy consumption and use renewable sources of energy as far as possible.

**Action Plan:**

- 1) The points of energy wastage and leakage should be identified and appropriate steps shall be taken to set a target of attaining significant energy saving by appropriate modifications and adopting best practices.
- 2) The fluorescent lights may be replaced with LED in the existing buildings and street lights across the campus.
- 3) Use of renewable sources of energy should be increased either by installing solar panels on rooftops as well as suitable open places or by other suitable means.

### 6.4 Water Management Plan for Optimum Usage of Water

The university shall adopt a sustainable water management plan to prevent wastage of water as well as recycle and reuse wastewater in the university campus.

**Action Plan:**

- 1) Reduction of potable water usage by efficient monitoring, using efficient fixtures and restricting usage for irrigation.
- 2) Installation of rainwater harvesting units at suitable locations in campus.
- 3) Use of Sustainable horticultural practices.

### 6.5 Reduction of Carbon Footprints

The university shall do possible efforts to reduce carbon footprints from university related activities via plantation drives and use of cleaner and eco-friendly methods.

**Action Plan:**

- 1) A methodology of calculating the carbon footprints of the whole institute should be developed and its improvement should be monitored.
- 2) Tree plantation drives on and off campus should be initiated to reduce the carbon footprints.



- 3) Provisions should be made to motivate the staff and students for using bicycles, public transport and/or car pool at least once a week for routine transportation.

#### **6.6 Plastic free campus (avoid using single use plastic)**

The university shall make provisions to ban the use of single use plastic at university premises. Various awareness programmes may be initiated to motivate the staff, students and people in surrounding areas to phase out single use plastic from their schedule.

#### **6.7 Biodiversity, Plantation and Landscaping of Campus**

Proper documentation of the flora and fauna at university premises should be done with the help of experts. Further, plantation should be done in a planned manner with expert advice to add both green cover and beauty to the campus. Landscaping of different sizes may be done at suitable open spaces with flowering plants, grass and accessories targeting towards the most beautiful green campuses in surrounding.

#### **6.8 Environmental Stewardship Awards**

The university shall announce Environmental Stewardship awards from time to time to recognize laudable performances of different departments and communities of the campus for their contribution and implementation of Waste Management and Eco Initiatives.

#### **6.9 Sensitisation, Awareness and Capacity Building Programs**

The university shall organize various workshops/seminars/dialogues/talks/creative actions/research programmes in order to sensitize the students, staff and community in surrounding about global and local environmental issues for moving towards a resilient future.

#### **6.10 Policy Monitoring and Review**

The advisory board shall monitor and review the efficacy of the policy on annual basis. Discreet or micro data could be made accessible to faculty and departmental heads for taking appropriate actions and complying with them on regular basis.



**In future times the policy document be made more inclusive for Green attributes by considering insertion of following additional commitments.**

1. **Tobacco Free premises** : To make the premises totally tobacco free. No tobacco products shall be allowed to be brought inside the University campus.
2. **Purchasing** : In purchasing its services, materials, equipment and consumable items, where possible, purchase items produced in ways which do least environmental harm, which are not supplied with excessive packaging; which are benign or at least harmless in their effect on the environment. Where possible, preference will be given to local or regional suppliers to maximize the university input to the local community as well as reduction of environmental impact due to transportation.
3. **Cleaning and Housekeeping** : Use of cleaning products based on environmental considerations as well as cost and suitability. It will monitor its working practices with a view to administering dosages so as to reduce the risk of over concentration and excess residue of unused cleaning mixtures finding their way into piped waste disposal systems.
4. **New Build and Building Refurbishment** That whenever new construction or refurbishment, work is planned and executed in a manner which reflects environmentally-responsible approaches defined by the National Building Code-2016.
5. **Green Travel Plan** : Promotion of the use of public transport, walking and cycling. The university, to ensure that staff where possible to use public transport when on University assignments. This plan shall be regularly reviewed. The travel of students shall also be encouraged through public transport.
6. **Food Policy** : That decisions pertaining to the purchase of food, together with the use and disposal of plastic crockery/cutlery, should at all times include environmental implications as well as such factors as cost and nutritional value. There will be efforts to sensitize students for avoiding food wastage.
7. **Environmental Rules and Guidelines** : commitment to ensure compliance to extant pollution control and other applicable environmental guidelines.
8. **Water Use** : To exhibit intentions to promote optimization of water use by avoidance of wastage, treatment and re-use of black water for other possible uses.
9. **Plastic Free Environment** : To commit for Plastic free environment in university premises.
10. **Commitment to review the policy annually or as per requirement.**



## Description of Campus

### Total Campus Area

<b>Area Chart- JC BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY-YMCA</b>					
<b>S. No</b>	<b>Building</b>	<b>Area-Sq. Mts.</b>	<b>S. No</b>	<b>Building</b>	<b>Area-Sq. Mts.</b>
1	Boys Hostel Mess	527.1	23	Machine room area	1254
2	C V Raman block boy's hostel ground floor plan	549.6	24	Administration dept. G/f area	924.3
3	C V Raman block boy's hostel first floor plan	442.7	25	Workshops(electrical workshop, comm. Wshp., etc) area	849.3
4	C V Raman block boy's hostel second floor plan	442.7	26	Workshops(rac, inter. Workshop, govt. Audit) area	549.9
5	Nehru block boy's hostel third floor plan	340.1	27	Mechanical block ground floor plan total area(g/f)	783.2
6	Girl's hostel ground floor plan	1882	28	Mechanical block first floor plan	783.2
7	Girl's hostel first floor plan	1542	29	Mechanical block second floor plan	783.2
8	Girl's hostel second floor plan total area	1367	30	Mechanical block third floor plan	783.8
9	Library block g/f area	663.4	31	Mechanical block fourth floor plan	693.5
10	Library block (computer dept.)-f/f	663.4	32	Nehru block boy's hostel ground floor plan	594.6
11	Library block (classrooms)2nd/f area	663.4	33	Nehru block boy's hostel first floor plan	442.7
12	Electrical engg. Dept. G/f area	1274	34	Nehru block boy's hostel second floor plan	442.7
13	Electrical dept. F/f area	924.3	35	Nehru block boy's hostel third floor plan	340.1
14	Auditorium block g/f area	538.4	36	Tagore block boy's hostel ground floor plan	549.6
15	Auditorium block f/f area	538.4	37	Tagore block boy's hostel first floor plan	442.7
16	Teaching block(prof. Cabins, labs, etc.) Area	507.5	38	Nehru block boy's hostel second floor plan	442.7
17	Teaching block(prof. Cabins, sports rm, pharmacy, etc.)	538.4	39	Tagore block boy's hostel third floor plan	340.1
18	Teaching block (Prof. Cabins, conference hall, etc.) Area	538.4	40	Zakir hussain boy's hostel ground floor plan	549.6

<b>S. No</b>	<b>Building</b>	<b>Area-Sq. mts.</b>	<b>S. No</b>	<b>Building</b>	<b>Area-Sq. mts.</b>
19	Computer dept. & chemistry labs f/f area	1274	41	Zakir Hussain boy's hostel first floor plan	442.7
20	Classrooms 2nd/f area	1274	42	Zakir Hussain boy's hostel second floor plan	442.7
21	.Math & physics labs 2nd/f area	924.3	43	Zakir Hussain boy's hostel third floor plan	340.1
22	Examination cell area	582.7			
	<b>Built up Area</b>	17998		<b>Built up Area</b>	<b>12774</b>
	<b>Total Built Up Area</b>	<b>30772</b>		<b>Total-30772.2 Sq.mts.</b>	

### **Pre Audit meeting**

A pre-audit meeting provided an opportunity to reinforce the scope and objectives of the audit and discussions were held on the practicalities associated with the audit. This meeting is an important prerequisite for the green audit because it is the first opportunity to meet the University concerned personnel for audit and deal with any concerns.

### **Management's Commitment**

The Management of the university has shown the commitment towards the green auditing during the pre-audit meeting. They were ready to encourage all green activities. It was decided to promote all activities that are environment friendly such as awareness programs on the environment, campus farming, planting more trees on the campus etc., after the green auditing. The management of the university was willing to formulate policies based on green auditing report.

### **Scope and Goals of Green and Environment Auditing**

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of economical, financial, social, environmental factor. It is necessary to conduct green audit in university campus because students become aware of the green audit, its advantages to save the planet and they become good citizen of our country. Thus Green audit becomes necessary at the university level.

## **Benefits of the Green and Environment Auditing**

- More efficient resource management
- To provide basis for improved sustainability
- Financial savings through a reduction in resource use
- Enhance the alertness for environmental guidelines and duties
- Development of ownership, personal and social responsibility for the University and its environment
- Enhancement of university profile
- To create a green campus
- To enable waste management through reduction of waste generation, solid- waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing and managing and monitoring of environmental and sustainable development
- Developing an environmental ethic and value systems in youngsters.
- Point out the prevailing and forthcoming complications
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- Impart environmental education through systematic environmental management approach and Improving environmental standards
- Benchmarking for environmental protection initiatives
- Green audit is a valuable tool in the management programs of the university.

## **Target Areas of Green and Environment Auditing**

Green audit forms part of a resource management process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency.

All these indicators are assessed in process of “Green Auditing of educational institute”. Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute’s energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, green campus and carbon footprint.

## Water Use Study

During audit, it has been seen that a lot of work for conservation of water has already been taken. It has been observed that annual water used in university is well within limits as per National Building code in vogue. After going through detailed use pattern it has been found that NBC-2016 standard use pattern are not only met but there is significant reduction of water use to the extent of 55% as per available data.

The following points needs attention and required to be addressed. The saving targets should be fixed for next 12 months and practice of recording and reviewing of water use on day to day basis for pointing out any sudden variation.

- ❖ All plumbing fixtures should be regulated from valves for reduction of flow. This practice has already started and all taps be replaced when becomes due for replacement after end of life with water efficient fixtures as per plan and the plumbing fixtures in frequently used area should be replaced on priority.
- ❖ All cisterns be replaced with dual mechanism low flow cisterns so that water can be used efficiently as per requirement as and when these become due for replacement.
- ❖ There are Awareness program conducted and these should be organized for staff as well as students through seminars and workshops with increased frequency for reduction of water foot print..
- ❖ Rain Water harvesting system that has been provided should be maintained as per requirement.
- ❖ There is no run off of water from premises even during peak rains which is very good effort and thus water table is not depleted.
- ❖ Water Meters should be got provided for individual uses for monitoring of different water use in order of priority.
  - a. Canteen
  - b. Individual Hostels
  - c. Mess
  - d. Chemistry Lab and other Lab.
  - e. Water used for Landscaping.
- ❖ Water conservation target over the present consumption should be fixed by top management and action for meeting these reductions be initiated.
- ❖ There should be stickers and bills for water conservation pasted in university premises.
- ❖ Students should also be involved along with all stake holders for water conservation.

## **Auditing for Water Management**

Water is a natural resource; all living matters depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. We need to use water wisely to ensure that drinkable water is available for all, now and in the future.

**A small drip from a leaky tap can waste more than 180 liters of water to a day;** that is a lot of water to waste - enough to flush the toilet eight times! Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices. Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water. It is therefore essential that any environmentally responsible institution examine its water use practices.

### **Water Audit**

There are nearly 4629 students studying in campus and out of which 329 students reside in hostel .

There is ample awareness of management of university campus towards sustainability. Management of university is very instrumental in spearheading movement of sustainable practices in running of university and also facilitating dissemination of these practices to all students studying in this campus. It is through support of management and active involvement of other stake holders and staff members that this university has many accolades to be a matter of pride for all concerned.

In all matters of resource use, there is effective implementation of 3R's. Reduction of resource use, Recycling of resources and also re-use. It is for attaining objectives of sustainability.

### **Introduction to water management**

Why conserve water:

Water is the most precious of all resources, to sustain it, is to preserve life. However, the careless attitude towards the misuse of fresh water linked with its growing scarcity caused by population growth and climate change, suggests that rational use of water and the adoption of conservation measures are urgently needed.

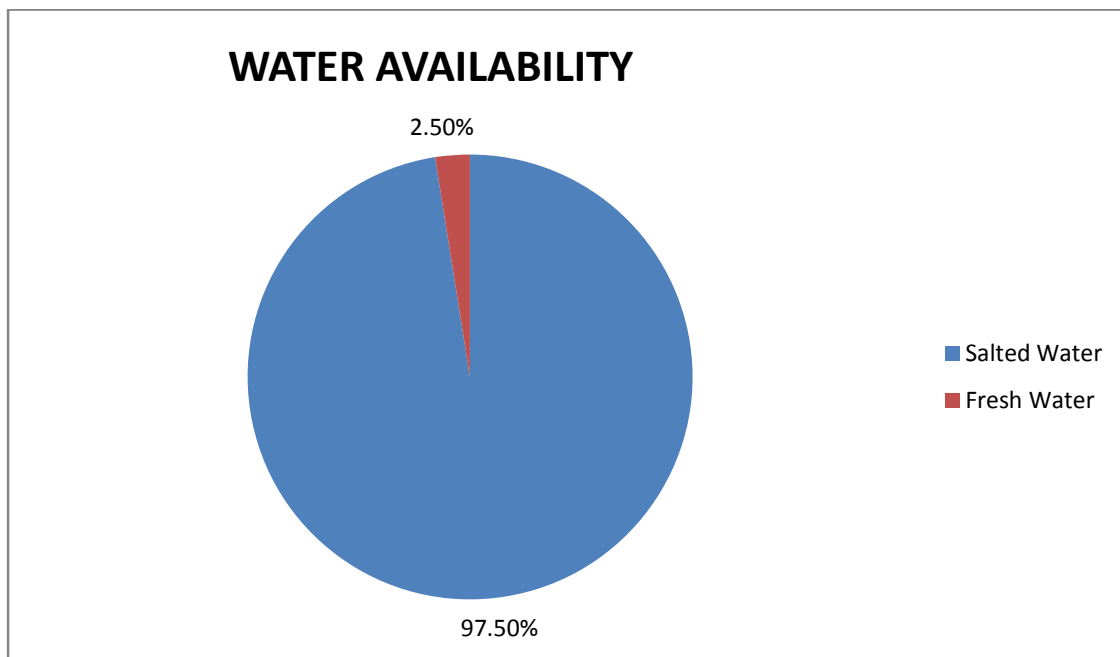
To sustain this valuable resource, it is imperative to first understand how and where water is used in university buildings and compare this consumption with benchmarks. This would enable the sector to realize the water saving potential that exists and help in devising effective strategies to achieve it.

For years freshwater supplies have been assumed to be an inexhaustible resource, strongly depending on its regenerative capacity offered by the naturally occurring water cycle. Our planet contains a finite quantity of water, where 97.5% of the supply can be found within the oceans in the form of saltwater and only 2.5% is fresh.

Most of this freshwater is difficult to access, in the form of ice within the Polar Regions and mountains or groundwater. Only 0.01% of all water on Earth is useable by ecosystems and humans

There are also a number of human-induced factors which are affecting the quality and quantity of global freshwater resources.

- Increase in demand due to population growth leading to over exploitation of water sources.
- Degeneration of water quality due to human activities such as deforestation, urban growth, industrial and agricultural practices.
- Change in rainfall patterns due to global warming and climate change.



Why consider water conservation in university buildings?

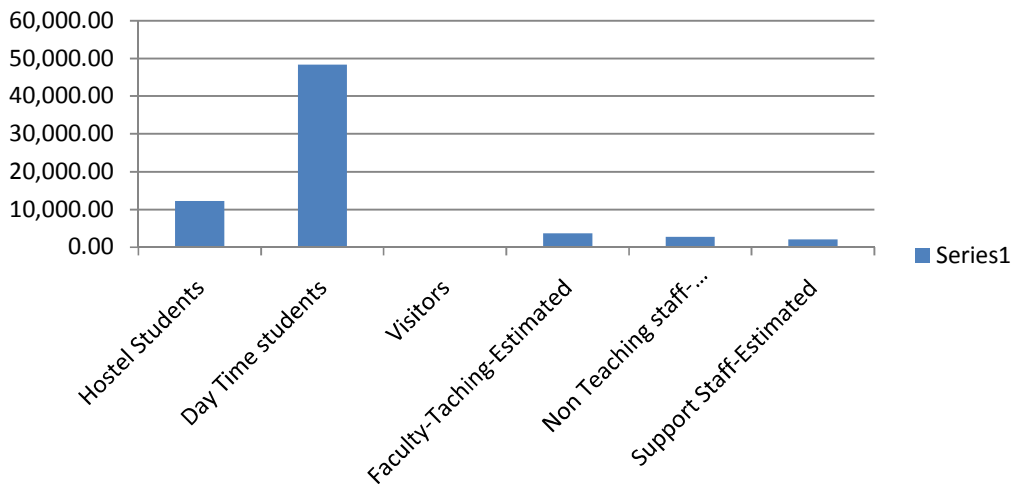
- **Environmental conservation:** Reducing dependence on mains water supply can reduce the strain on an increasingly scarce resource.
- **Future legislation:** The government is currently reviewing its policy for setting targets for water consumption. It is only a matter of time before mandatory regulations are introduced.
- **Social responsibility:** University's have a role to play and can lead by example.
- **Reduced water bills:** Efficient use of water within university buildings will lead to reduced water bills as well as low energy bills.

**Hence, all new and existing university buildings/university campus should attempt to close the loop within the water cycle.**

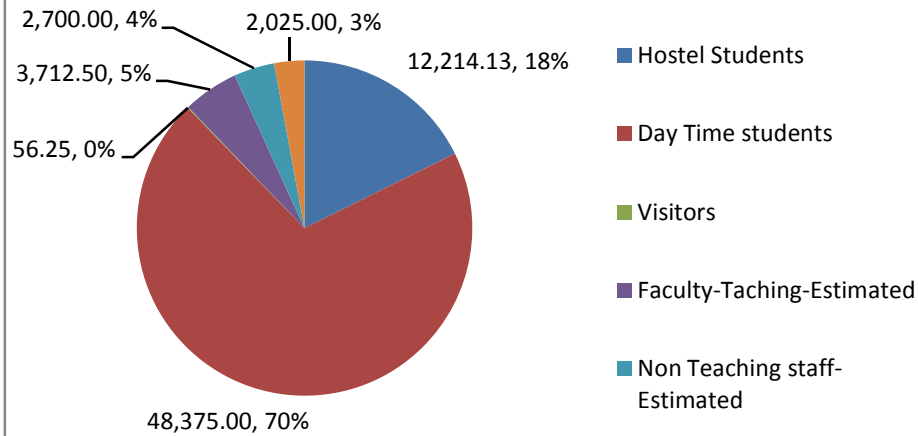
- Precipitation falling on sites should in theory re-charge aquifers and natural waterways.
- Water entering a university building should be used efficiently, in order not to diminish its source, and returned to the natural environment in a state that enhances aquatic habitat.
- If contamination occurs, the building should provide the necessary treatment to remove pollutants. To achieve the above objectives, it is essential to understand where and how much water is used within the university buildings.

<b>Theoretical Annual Consumption of water -YMCA-JC BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY -YMCA Faridabad</b>								
<b>S. No.</b>	<b>Type of Occupants</b>	<b>Stay Hrs.</b>	<b>No. of Occupants/Visitors</b>	<b>Full Time Eq.</b>	<b>Water Consumption As per NBC-2016-Norms</b>	<b>Theoretical Consumption-Kilo Litres per day-NBC</b>	<b>No. of days in year-Use</b>	<b>Annual Consumption in kL-Theoretical</b>
1	Hostel Students	24	329	329	135	44.415	275	12,214
2	Day Time students	8	4300	4300	45	193.5	250	48,375
3	Visitors	1	120	15	15	0.225	250	56
4	Faculty-Teaching-Estimated	8	150	300	45	13.5	275	3,712
5	Non Teaching staff-Estimated	8	75	200	45	9	300	2,700
6	Support Staff-Estimated	8	50	150	45	6.75	300	2,025
			<b>Total</b>			<b>267.39</b>		<b>69,082</b>

### Theoretical Annual Water Consumption benchmark for Occupants/Users



### Theoretical Annual Water Consumption for Occupants/Users





**From Pie Chart it is observed that 70 % of total annual water consumption- Theoretical allowance is in use by day time students and staff and followed by water consumption in hostels.**

The maximum conservation opportunities lie in these areas. Special attention should be given in Hostel and there should be regular water leak audits conducted and report should be documented.

As presently data for extraction of water is not available, it is recommended that all input source of water should be metered and the consumption pattern should be reviewed daily/weekly and monthly and any significant deviation in consumption should be immediately addressed.



**J.C. Bose University of Science & Technology YMCA, F**  
 (A Haryana State Government University)  
 (Established by Haryana State Legislative Act No. 21 of 2009 & Recognized by UGC Act 1956 u/s 22 to C  
 Accredited 'A' Grade by NAAC  
 Construction & Maintenance

No. EMNT/2020-21/

Date:

Subject: Turf/Playground area in campus.

Play ground area of the University campus.

1x250'x500' = 125000 Sqft.

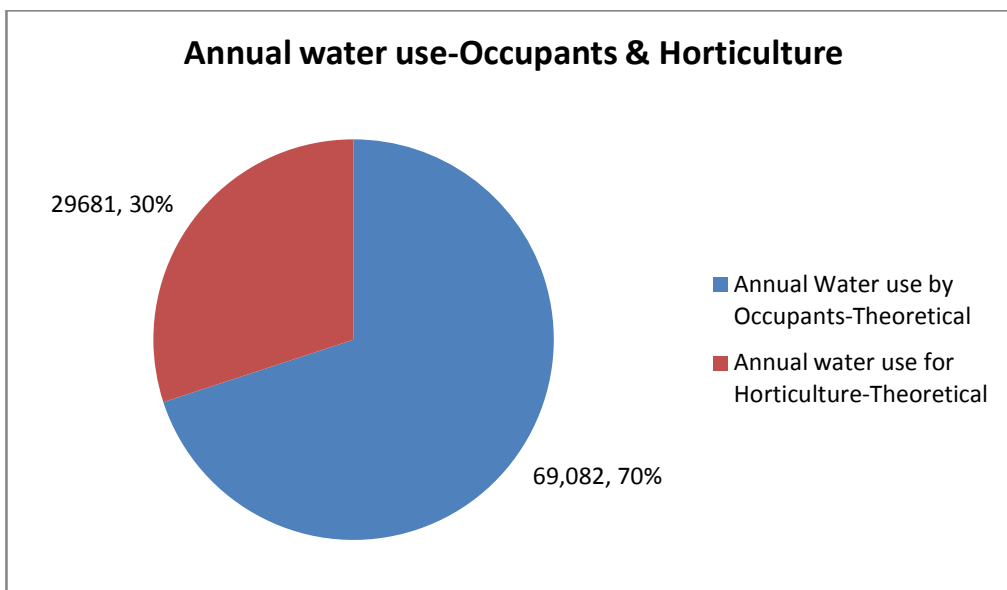
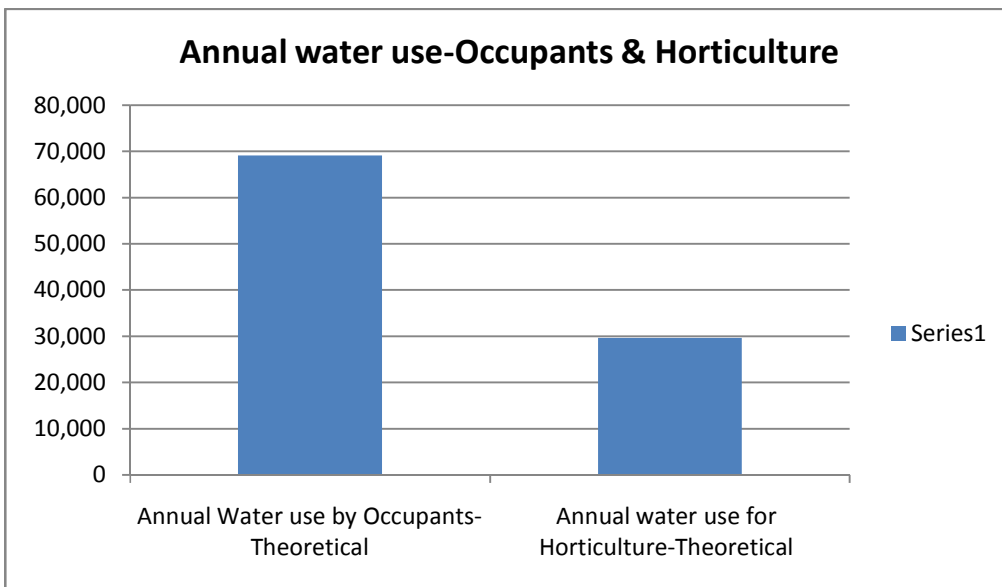
J.E (Civil)

S.D.E (Civil)

<b>Horticulture water calculation</b>						
S.No.	Area	sq. ft.	Sq.mts.	Daily water requirement- Lts /day/sq.mts.	Daily water requirement in kL/Day	Annual Water requirement for Horticulture
1	Total turf Area	125000	11617	7	81.319	29681

### Abstract of Water Use in University

S.No.	Water use	Qty-Kilo-Litres
1	Annual Water use by Occupants-Theoretical	69,082
2	Annual water use for Horticulture-Theoretical	29681
	<b>Total Annual water consumption</b>	<b>98,763</b>



Annual Water Consumption water bills

कार्यालय नगर निगम फरीदाबाद

बिल नं० 022 पुस्तक नं० 2349  
नाम Y.M.C.A. Institute बिल जारी करने की तिथि .....  
पता Sec. 44835 वर्तनाम रीडिंग 65385  
पिछली रीडिंग 25495  
कुल खपत रीडिंग 29890  
फ्लैट रेट .....

बिल भुगतान की अंतिम तिथि .....  
पानी भुगतान बिल 15-08-2019

कृपया अपने मकान / प्लॉट / दुकान औद्योगिक केन्द्र के पानी के बिल का भुगतान सम्बन्धित निगम के कार्यालय में करें, जिसका विवरण निम्न प्रकार है :

1. पिछला बकायाजात रु० 0
2. राशि मास 01-10-17 से 30-06-18 तक रु० 448350-
3. सीवर चार्ज रु० 59780-
4. कुल राशि रु० 40488-
5. यदि बिल भुगतान की अंतिम तिथि तक अदा नहीं किया गया तो 10 प्रतिशत सरचार्ज लिया जायेगा। 5486188

कार्य दिवस में बिल जमा करवाने का समय  
प्रातः 9.30 से 12.30 बजे तक

कार्यकारी अभियन्ता  
डिवीजन-

5/8/19

कार्यालय नगर निगम फरीदाबाद

2349

बिल नं० 023

पुस्तक नं०

नाम Y.M.C.A. Trus

बिल जारी करने की तिथि

पता Sec 6 FBD

वर्तनाम रीडिंग 39746

कुल अंश 276845  
प्रद 104-105 = 2442750  
252417.50

पिछली रीडिंग 23457

कुल खपत रीडिंग 16285

फ्लैट रेट

Say 252417.50

बिल भुगतान की अंतिम तिथि

पानी भुगतान बिल 15-08-2019

कृपया अपने मकान / प्लॉट / दुकान औद्योगिक केन्द्र के पानी के बिल का भुगतान सम्बन्धित निगम के कार्यालय में करें, जिसका विवरण निम्न प्रकार है :

1. पिछला बकायाजात रु० 244275
2. राशि मास 10-10-11 से 30-06-19 मास तक रु० 32570
3. सीवर चार्ज रु० 276845
4. कुल राशि
5. यदि बिल भुगतान की अंतिम तिथि तक अदा नहीं किया गया तो 10 प्रतिशत सरचार्ज लिया जायेगा ।

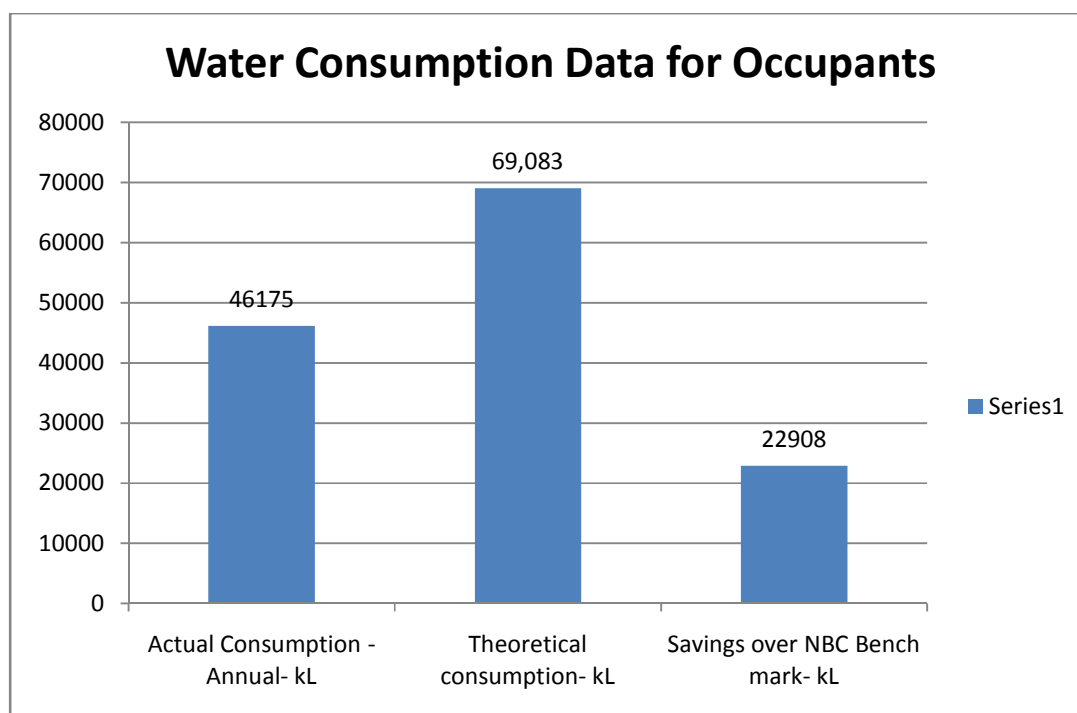
कार्य दिवस में बिल जमा करवाने का समय  
प्रातः 9.30 से 12.30 बजे तक

कार्यकारी अभियन्ता  
डिवीजन-

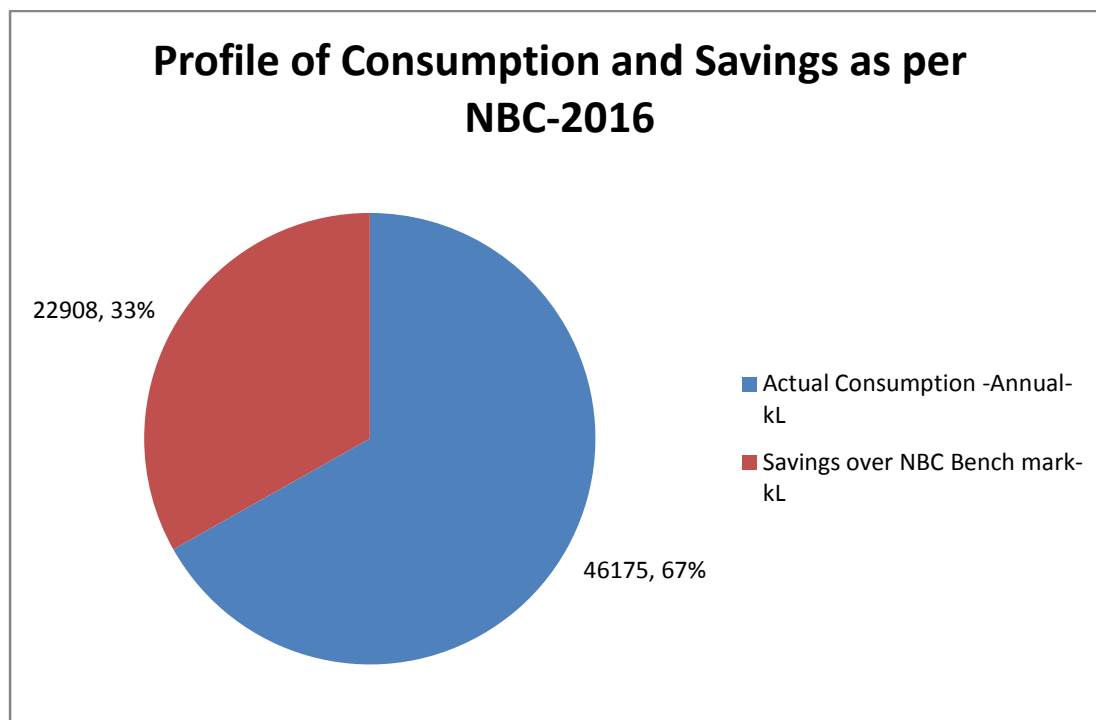
8/8/14

<b>Annual Water Consumption Data</b>						
S.No.	Period	Months	Bill-1	Bill-2	Total Consumption	Annual Consumption-Calculated
1	1-10-2017 to 30-06-2019	18	29890	16285	46175	46175

<b>Water consumption Profile</b>	
<b>Actual Consumption -Annual- kL</b>	<b>46175</b>
<b>Theoretical consumption- kL</b>	<b>69,083</b>
<b>Savings over NBC Bench mark- kL</b>	<b>22908</b>



## Profile of Consumption and Savings as per NBC-2016



### OBSERVATIONS

S. No.	Observation/Parameters	Yes/No	Recommendations
1	Is there any bench mark for water use	Yes	Consumption of water for human consumption is lower than NBC Bench Mark and the water use is managed effectively.
2	Is the water conservation opportunities identified	Yes	There is a practice in vogue to reduce water consumption.
3	Are there any signs, posters or stickers in university premises to encourage water efficiency and remind students to report leaks?	No	Suitable water conservation stickers and bills should be displayed conspicuously for creating awareness
4	Is there any water management team to review water use?	No	Establish a water management team and meet regularly to review use and identify water saving opportunities. Consider involving students, teachers, administrative staff and even parents, visitors and volunteers.
5	Have you installed sub-meters in high water using areas?	No	Sub-meters in high water using areas should be got installed and monitor regularly to know accurately where water is used and identify any problems specially for external water use, individual hostels,

			kitchen/canteen such as leaks or other anomalies
<b>S.No.</b>	<b>Observation/Parameters</b>	<b>Yes/No</b>	<b>Recommendations</b>
	<b>Amenities</b>		
1	Are the taps in hand basins are water efficient ?	No	Install flow regulators to reduce flow to at least 4.5L/min: If taps are used only for hand washing, consider a flow rate as low as 1.7L/min for super efficiency. Consumption is priestly reduced by closing of valves.
2	Do cleaners hose down amenity areas?	No	If you must use a hose ensure it has a water efficient trigger nozzle.
3	Does University have single flush toilets?	Yes	Consider replacing single flush toilets with 6/3L or 4.5/3 L dual flush models, when these become due for normal replacement.
<b>S. No.</b>	<b>Observation/Parameters</b>	<b>Yes/No</b>	<b>Recommendations</b>
	<b>Canteen, Mess, Hand Wash Area</b>		
1	Are taps in kitchens water efficient?	No	If No, install 7.5L/min flow restrictors on kitchen/art room sinks . <b>Tip: Pre-rinse spray nozzles in kitchens can use less than 6L/minute and make it easier to rinse and clean dishes.</b>
2	Do staff leave taps running while they are cooking and cleaning?	No	Still , install stickers to remind staff to turn off taps. Consider installing sensor taps.
	<b>DNA : Data not available</b>		
	<b>Outdoor areas</b>		
1	Has appropriate staff completed the Water Conservation training	No	Ensure appropriate staff complete the Water conservation training.
2	Do campus sub-meter irrigation water supply?	No	Consider installing sub-meters to determine water use and identify any leaks, and monitor regularly.
3	Do you use an alternate water source to irrigate your landscape?	yes	Water rejected from RO is stored and used for irrigation purpose.
4	Do you have Water wise /Water efficient Plants in your garden?	Yes	A lot of native species have been planted there by reducing water requirement.
<b>S.No.</b>	<b>Observation/Parameters</b>	<b>Yes/No</b>	<b>Recommendations</b>
	<b>Training and Awareness</b>		
1	Whether staff in general are aware about importance and need of water conservation	No	The awareness should be created amongst all maintenance and operation staff.

2	Whether there is a program for sensitizing students through workshop/seminars to educate them regarding scarcity of water and its conservation	Yes	There are awareness program to create awareness amongst students through training
3	Whether there is a program in place to involve students in water conservation targets.	Yes	There should be regular active involvement of students , they being helpful in university as well as it shall be useful for them during their life time in future.



**Flow Rate of Fixtures Measured-YMCA-JC BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY University**

<b>Measured Flow Litres per Minute</b>					
<b>Sn o</b>	<b>Location</b>	<b>Wash Basin- Litres per Second</b>	<b>W.C. Point- Litres/Second</b>	<b>Bath Room Taps- Litres/Second</b>	<b>Remarks</b>
1	MBA Block Ladies	4.90	5.4		<b>Satisfactory</b>
2	MBA Block Gents	4.8	4.9		<b>Satisfactory</b>
3	MBA Block Faculty	4.49	5.30		<b>Satisfactory</b>
4	Mech. Department Boys	5.85	5.9		<b>Satisfactory</b>
5	Civil Department	5.8	4.16		<b>Satisfactory</b>
6	Toilet Near RAC Lab	6.0	5.85		<b>Satisfactory</b>
7	Boys Hostel	4.8	4.75	6.0	<b>Satisfactory</b>
8	Girls Hostel	4.32	5.9	37.97	<b>Satisfactory</b>
9	Computer Lab	6.8	4.95		<b>Satisfactory</b>
10	IT Class Room Boys	5.75	4.95		<b>Satisfactory</b>
11	IT Class Room Girls	3.99	4.35		<b>Satisfactory</b>
12	Physics Lab	5.20			<b>Satisfactory</b>
13	Chemistry Lab ( E - 202 )	5.15			<b>Satisfactory</b>
14	M.Sc. Environment Science Lab	4.95			<b>Satisfactory</b>
15	Chemistry Lab ( F - 11 )	5.41			<b>Satisfactory</b>
16	Toilet E - 124	5.8	1.96	5.7	<b>Satisfactory</b>

### Inventory of Toilets- YMCA

<b>TOILET INVENTORY - YMCA</b>						
<b>S No.</b>	<b>Location</b>	<b>WC</b>	<b>WASH BASIN</b>	<b>URINAL</b>	<b>BIB COCK</b>	<b>HAND RAIL</b>
	<b>GROUND FLOOR - MAIN OFFICE TEACHING BLOCK</b>					
1	HANDICAPPED	1	1		1	3
2	MALE	2	2	2	2	
3	MALE LB DEPT.	1	1		1	
4	MALE CE DEPT.	1	1	1	1	
5	MALE CE DEPT.	3	2	3	3	
6	FEMALE CE DEPT.	2	1		2	
7	MALE DP BACK SIDE	1	1	3	1	
8	FEMALE HM CELL	1	2		1	
9	MALE BOARD ROOM	1	1	1	1	
10	MALE HM CELL DEPT.	1	1	3	1	
11	MALE SK HALL	1	1	1	1	
12	MALE MBA DEPT.	2	3	3	3	
13	FEMALE MBA DEPT.	2	2		2	
14	MALE V.C. OFFICE	1	1	1	1	
15	MALE REGISTRAR OFFICE	1	1	1	1	
16	MALE GELLARY NEW VC OFFICE	1	1		1	
17	MALE MMC	1	1		1	
	<b>FIRST FLOOR - TEACHING BLOCK</b>					
1	MALE E. L . DEPT.	1	1	1	1	
2	FEMALE E. L . DEPT.	1	1		1	
3	FEMALE E. L . DEPT.	3	1		4	
4	MALE E. L . DEPT.	2	2		2	
5	MALE COMPT. DEPT.	3	2	2	3	
6	FEMALE COPT. DEPT.	1	1		1	
7	MALE AUDIOTORIUM MBA	1	1		1	
8	FEMALE AUDIOTORIUM MBA	1	1		1	
	<b>SECOND FLOOR - TEACHING BLOCK</b>					
1	COE DEPT. MALE		1	2		
2	COE DEPT. FEMALE	1	1		1	
3	ELECTRICAL DEPT. FEMALE	2			3	
4	ELECTRICAL DEPT. FEMALE	1	1		2	
5	HAS DEPT. MALE	1	1	1	1	
6	IT DEPT. FEMALE	2	1		2	

7	IT DEPT. MALE	3	1	2	3	
	<b>THIRD FLOOR - TEACHING BLOCK</b>					
1	ELECTRICAL CLASS ROOM MALE	1	2	2	2	
2	ELECTRONIC DEPT. FEMALE	1	1		1	
3	IT DEPT. FEMALE	1	2	2	2	
4	IT DEPT. MALE	1	1		1	
	<b>MECHANICAL DEPARTMENT</b>					
1	GROUND FLOOR MALE	2	3	4	2	
2	GROUND FLOOR FEMALE	3	3		3	
3	FIRST FLOOR MALE	2	3	4	2	
4	FIRST FLOOR FEMALE	3	3		3	
5	SECOND FLOOR MALE	2	3	4	2	
6	SECOND FLOOR FEMALE	3	3		3	
7	THIRD FLOOR MALE	2	3	4	2	
8	THIRD FLOOR FEMALE	3	3		3	
9	FORTH FLOOR MALE	2	3	4	2	
10	FORTH FLOOR FEMALE	3	3		3	
	<b>BANK BUILDING</b>					
1	GROUND FLOOR MALE	1	1	1	1	
2	GROUND FLOOR FEMALE	1	1		1	
3	FIRST FLOOR MALE	3	3	4	3	
4	SECOND FLOOR MALE	3	3	4	3	
5	THIRD FLOOR MALE	3	3	4	3	
	<b>MAINTENANCE DEPARTMENT</b>					
1	GROUND FLOOR JE OFFICE	1	1	1	1	
2	SDE OFFICE	1	1	2	1	
3	STUDENT/PRESIDENT OFFICE	1	1	2	1	
4	FIRST FLOOR MALE	1	2	3	1	
5	FIRST FLOOR FEMALE	2	2		2	
6	SECOND FLOOR MALE	1	1	2	1	
7	SECOND FLOOR FEMALE	2	1		2	
8	THIRD FLOOR MALE	1	1	2	1	
9	THIRD FLOOR FEMALE	2	1		1	
	<b>BOYS HOSTEL - GROUND FLOOR</b>					
1	C.V RAMAN LEFT SIDE MALE	2	2	1	8	
2	C.V RAMAN SPECIALLY ABLED MALE	1	1		3	
3	C.V RAMAN RIGHT SIDE MALE	2	2	1	8	
4	ZAKIR HALL LEFT SIDE MALE	2	2	1	8	
5	ZAKIR HALL RIGHT SIDE MALE	2	2	1	8	

6	NEHRU HALL LEFT SIDE MALE	2	2	1	8	
7	NEHRU HALL RIGHT SIDE MALE	2	2	1	8	
	<b>BOYS HOSTEL - FIRST FLOOR</b>					
1	C.V RAMAN LEFT SIDE MALE	2	2	1	8	
2	C.V RAMAN RIGHT SIDE MALE	2	2	1	8	
3	ZAKIR HALL LEFT SIDE MALE	2	2	1	8	
4	ZAKIR HALL RIGHT SIDE MALE	2	2	1	8	
5	NEHRU HALL LEFT SIDE MALE	2	2	1	8	
6	NEHRU HALL RIGHT SIDE MALE	2	2	1	8	
	<b>BOYS HOSTEL - SECOND FLOOR</b>					
1	C.V RAMAN LEFT SIDE MALE	2	2	1	8	
2	C.V RAMAN RIGHT SIDE MALE	2	2	1	8	
3	ZAKIR HALL LEFT SIDE MALE	2	2	1	8	
4	ZAKIR HALL RIGHT SIDE MALE	2	2	1	8	
5	NEHRU HALL LEFT SIDE MALE	2	2	1	8	
6	NEHRU HALL RIGHT SIDE MALE	2	2	1	8	
	<b>BOYS HOSTEL - THIRD FLOOR</b>					
1	C.V RAMAN LEFT SIDE MALE	2	2	1	8	
2	C.V RAMAN RIGHT SIDE MALE	2	2	1	8	
3	ZAKIR HALL LEFT SIDE MALE	2	2	1	8	
4	ZAKIR HALL RIGHT SIDE MALE	2	2	1	8	
5	NEHRU HALL LEFT SIDE MALE	2	2	1	8	
6	NEHRU HALL RIGHT SIDE MALE	2	2	1	8	
	<b>GIRLS HOSTEL - GROUND FLOOR</b>					
1	KASTURBA HALL SPECIALLY ABLED	1	1		2	
2	KASTURBA HALL FIRST	2	2		6	
3	KASTURBA HALL SECOND	2	2		6	
4	SAROJANI HALL FIRST	2	2		6	
5	SAROJANI HALL SECOND	2	2		6	
6	MOTHER TERRESA HALL FIRST	2	2		6	
7	MOTHER TERRESA HALL SECOND	2	2		6	
8	LAXMIBAI HALL GUEST HOUSE	1	1		1	
9	KALPANA CHAWLA HALL FIRST	2	2		6	
10	KALPANA CHAWLA HALL SECOND	2	2		6	

11	SAROJANI HALL	2	1		2	
	<b>GIRLS HOSTEL - FIRST FLOOR</b>					
1	KASTURBA HALL FIRST	2	2		6	
2	KASTURBA HALL SECOND	2	2		6	
3	SAROJANI HALL FIRST	2	2		6	
4	SAROJANI HALL SECOND	2	2		6	
5	MOTHER TERRESA HALL FIRST	2	2		6	
6	MOTHER TERRESA HALL SECOND	2	2		6	
7	KALPANA CHAWLA HALL FIRST	2	2		6	
8	KALPANA CHAWLA HALL SECOND	2	2		6	
	<b>GIRLS HOSTEL - SECOND FLOOR</b>					
1	KASTURBA HALL FIRST	2	2		6	
2	KASTURBA HALL SECOND	2	2		6	
3	SAROJANI HALL FIRST	2	2		6	
4	SAROJANI HALL SECOND	2	2		6	
5	MOTHER TERRESA HALL FIRST	2	2		6	
6	MOTHER TERRESA HALL SECOND	2	2		6	
7	KALPANA CHAWLA HALL FIRST	2	2		6	
8	KALPANA CHAWLA HALL SECOND	2	2		6	
	<b>GIRLS HOSTEL - THIRD FLOOR</b>					
1	KALPANA CHAWLA HALL FIRST	2	2		6	
2	KALPANA CHAWLA HALL SECOND	2	2		6	

## OBSERVATIONS AND RECOMMENDATIONS

	<b>Action steps for Water management – Design and Construction</b>
A	<b>Reduce</b> water consumption through efficient fixtures.
1	Efficient plumbing design. Two stack system design for future to reduce STP energy consumption and pumped water energy.
2	Sub metering of water for separate uses
3	Efficient fixtures such as low flow taps, shower heads and toilets and <b>Water less urinals as per applicability in Gents Toilet.</b>
4	Efficient appliances for catering and other uses with specified water efficiency standards.
5	<b>Recycle</b> water using <b>Grey Water</b> systems. Being done–recycled water data be maintained.
6	<b>Rain water is captured in rain water harvesting pits- Maintenance of RWHS is required to be done periodically.</b>
7	Automatic shut off of Pump should be installed so that there is no wastage of water and Energy.
8	Log Book for running of Pump to be maintained
9	Check Leakage through internal audits-Weekly
	<b>OPERATION &amp; MAINTENANCE</b>
1	As the building is operational, further reductions in water use can still be Made depending on how efficiently the building is run. Efficient fixtures and fittings reduce the amount of flow of water; however, it is equally important that water use is periodically assessed or audited to detect wastage caused either by the users or due to leakage. This will also help the building management in devising appropriate strategies for water conservation.
2	There is a potential for reduction and optimization of water simply and inexpensively by internally auditing water use and identifying appropriate water-saving measures
3	Install push button type individual manual urinal flushing system, Provide dual flushing systems and make users aware of the use of such installed systems.
4	Repair, replace leaking taps.

## Rain Water Harvesting system

The following Rain Water harvesting system pits have been installed.

Rain Water harvesting Pit				
S.No.	Location	Qty.	Depth-in Feet	Dia of pipe-MM
1	Near Main gate	1	100	200
2	North West corner of play Ground	1	100	200
3	Back Side of Computer Ground	1	100	150
4	Near basket ball play Ground	1	100	200
5	Near VC House	1	100	200

As per the data furnished, there are 5 nos. Rain water harvesting pits have been provided.

There is requirement of regular maintenance of these pits to clear these of any silt deposit etc. so that capacity and quality of water fed to these pits is not reduced.

### Auditing for Energy Management

Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power. This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. An old incandescent bulb uses approximately 60W to 100W while an energy efficient light emitting diode (LED) uses only less than 10 W. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices. **LED use also has a peculiar advantage towards environment that LED's are not using any mercury as the case of CFL's or Fluorescent tubes.**

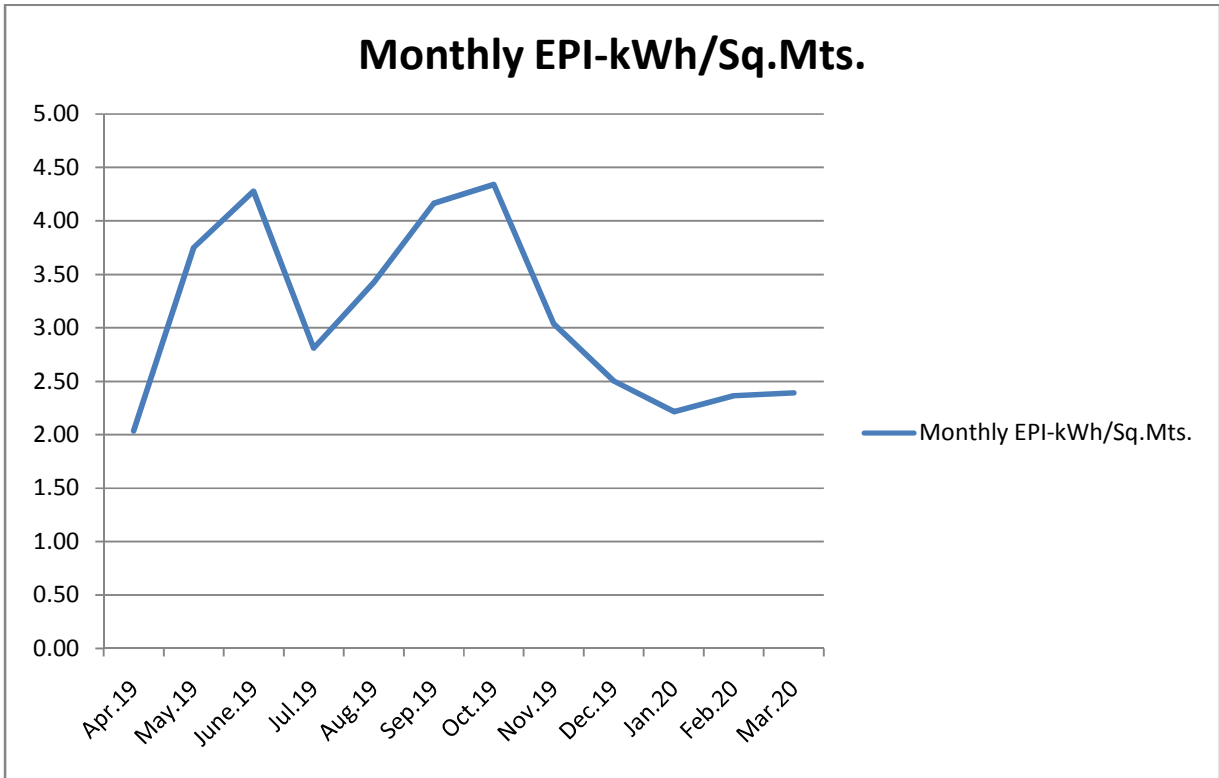
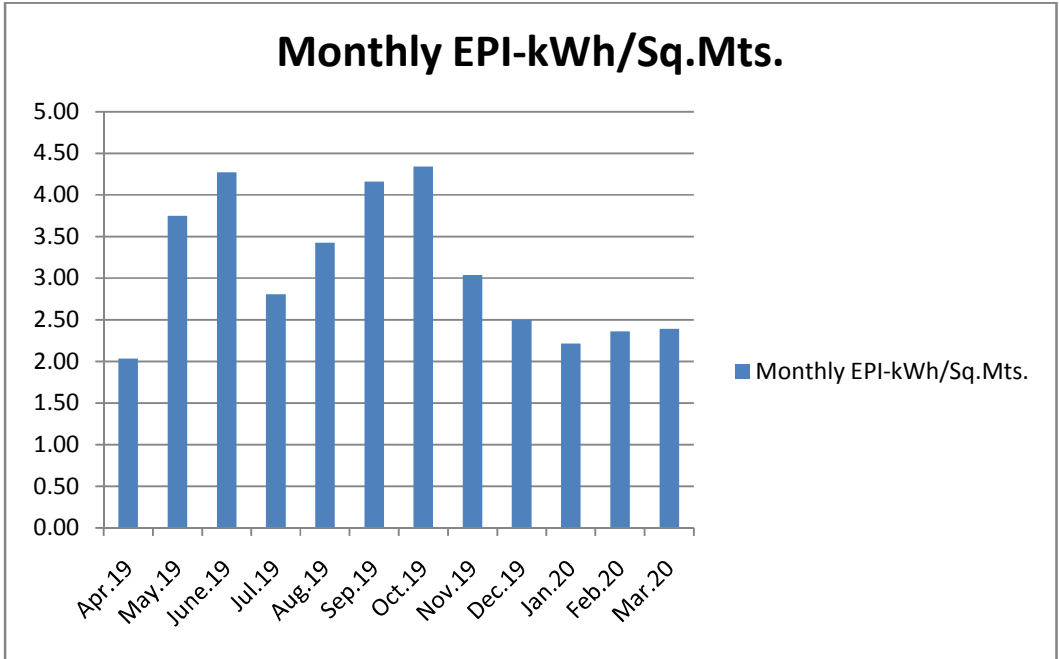
## Energy use and Energy performance Index

### Energy Performance Index

#### EPI Calculation

S.No.	Month	kWh -Electricity Bill	Monthly EPI- kWh/Sq.Mts.
1	Apr.19	62600	2.03
2	May.19	115418	3.75
3	June.19	131575	4.28
4	Jul.19	86430	2.81
5	Aug.19	105423	3.43
6	Sep.19	128049	4.16
7	Oct.19	133564	4.34
8	Nov.19	93481	3.04
9	Dec.19	76984	2.50
10	Jan.20	68154	2.21
11	Feb.20	72708	2.36
12	Mar.20	73547	2.39
	<b>Total-kVah</b>	<b>1147933</b>	
	<b>kVAh-DG Set</b>	<b>33150</b>	
	<b>Total Annual units</b>	<b>1181083</b>	
	<b>Total Area-Sq.mts.</b>	<b>30772.2</b>	
	<b>EPI- kWh/Sq.Mts./Annum</b>	<b>38.38</b>	





Annual EPI is 38.38 kWh per Sq. Mts /Annum for the period April-2019 to march-2020.

This can be reduced to the extent of 30 to 40 % with implementation of Energy audit recommendations. Energy audit has recently been conducted.

#### RENEWABLE ENERGY

There are no renewable energy system installed. There is a proposal for installation of solar PV plant under RESCO model.



**J.C. Bose University of Science & Technology YMCA, Faridabad**  
(A Haryana State Government University)  
(Established by Haryana State Legislative Act No. 21 of 2009 & Recognized by UGC Act 1956 u/s 22 to Confer Degrees)  
Accredited 'A' Grade by NAAC  
Construction & Maintenance

No. EMNT/2020-21/

Date:

Subject: Capacity of installed solar water heating system and solar PV System

The above said work is under process

  
S.D.E (Civil)

## Auditing for Waste Management

There is a contract with agency for Solid waste management handling.

S.No.	Description	HSN / SAC Code	Area / Unit	Bill Month	Rate Per Month	Amount (INR)
1.	User charges against collection of garbage	9994	20 Acre	01 July 2019 To 30 June 2020	16100	193200
	CGST-9%					17388
	SGST-9%					17388
<b>Sub Total:</b>						193200
<b>Tax Amt:</b>						34776
<b>Round Off:</b>						0
<b>Total:</b>						2,27,976

**Terms & Conditions**

1. Payment should be made with in 15 days. Delay Charges @18% is applicable after due date.
2. Payment can be done in the mode of cash, cheque, RTGS, NEFT.
3. RTGS cheques will be made in the favour of "Eco Green Services" A/c 50200052443718 & IFSC Code: HDFC0000615
4. Reverse charges applicaple - NO

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. Plastic bags and discarded ropes and strings can be very dangerous to birds and other animals.

This indicator addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Solid waste can be divided into two categories:

**General waste and hazardous waste.** General wastes include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and petrol. Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change.

Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair, and reuse. Thus the minimization of solid waste is essential to a sustainable campus. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems. It is therefore essential that any environmentally responsible institution examine its waste processing practices.

**E-Waste :** The old computers are sold back to vendor which is again put to beneficial use by repairing and it is good sustainable practice. Material not reusable is re-cycled as per extant guidelines.

**Key Boards and mouse** which become un-serviceable are also disposed off. It is required to be ensured that vendor dealing with E-waste is authorised to collect E-waste.

**Hazardous Waste :** Lead Acid Cell Batteries are returned to Vendors for re-cycling of lead and other constituents.

**Fluorescent tubes** are handed over to Junk dealer who in turn should send them to Local re-cycling units. Storage of Fluorescent tubes in university should be as per recommended practice.

### **Auditing for Green Campus Management**

Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature's delicate balance and our quality of life. Without this variability in the living world, ecological systems and functions would break down, with detrimental consequences for all forms of life, including human beings. Newly planted and existing trees decrease the amount of carbon dioxide in the atmosphere. Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen that a single tree produces is enough to provide one day's supply of oxygen for people. So while you are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner for us. Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which a huge deal is considering many students are under some amount of stress.

## **WASTE- Types of waste generated in campus**

- E-waste-Yes-Handled as per extant guidelines and rules.

## **Details of Computers installed and disposed**

### **E-Waste disposal**

The record of use and handling of E-waste is maintained .While disposing/Auction or sale of E-waste credential of purchaser should be documented to ensure that vendor is authorised for collection and ensuring re cycling of E-waste as per extant guidelines.

- Hazardous waste (toxic)-yes  
For safe handling and management of hazardous waste in an environmentally sound manner, Govt. of India has notified the Hazardous Waste (Management & Handling) Rules, 1989, under the Environment (Protection) Act, 1986. However, these Rules were suppressed with re notification of the Hazardous Wastes (Management, Handling and Trans boundary Movement) Rules, 2008. Under the said Rules, hazardous waste has been defined as those wastes which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment, whether alone or when in contact with other wastes or substances, and shall include wastes as specified in Schedules of the Rules.
- Solid waste-yes-Extra waste removed through truck and disposed in municipal waste collection points
- Dry leaves-Yes-Used in university for making manure/compost
- Canteen waste-yes-Used for Compost in university
- Liquid waste-yes-Preserved and used in university
- Glass-Yes-sent for recycling.
- Unused equipment-yes-Returned to vendors through sale
- Plastic waste-Yes-Segregated and removed

## **Canteen Waste-Handling practice**

1. There are no signs provided in Mess and Cafeteria for avoiding food wastage and take food as per requirement and there should not be any food wastage. These signage are required to be provided in all area where food is served or consumed.

1. All Hostel Mess
2. Canteen
3. Cafeteria

### **FOOD PROCUREMENT AND DISPOSAL**

1. Food is prepared in Canteen/Mess and any food waste that is generated is filled in compost pits for preparation of natural manure.
2. A good effort has been made to maintain all waste data for food. Record for all other types of wastes is also required to be maintained for better management.
3. Effort should be made for reduction of onsite wastages.

## **Disposal of Fluorescent tubes-Guidelines**

### **Consumer Level:**

As per the present observed practice at consumer level in the society at large, often, the used lamps are collected by the kabari from the households and collectively handed over to the glass recyclers for the recovery of glass material.

This is all operative in a highly unorganized sector. It has, also, been observed that, the used lamps are thrown in the garbage bins and finally into the municipal garbage dumpsites, contaminating air, water and soil. Most of the used lamps are broken either at transit solid waste bins (provided by local civic authority) or broken during the transport to the final disposal site.

A portion of the mercury, in vapor form, is released into the air; whereas rest of the mercury is released onto the soil with further possibility of getting into the surface and/or ground water bodies through the leachate from soil.

**Establishment Level - Handling of Used/Broken Fluorescent Lamps (FLs):** The consumers may handle and dispose the used lamps as described below: Domestic Consumers:

- (i) The consumer must ensure that (s)he does not throw used lamps in the general trash bin but hands them over (in a properly packed form) to a kabari (an individual) or a collection agency identified by an authorized Lamp Recycling Unit for proper recycle / disposal of used FLs.
- (ii) The used intact FLs may be stored either in the same boxes in which new lamps are brought or other boxes of similar size. They should be stored upright. The due precaution may be taken while packing more than one used lamp, so as not cause the possibility of breakage during the storage and transportation.
- (iii) Even, the broken FLs, after due clean up may be handed over for safe recycling and disposal.

Here are some guidelines for cleaning up a broken CFL:

- (i) Open a window and leave the room (restrict access) for at least 15 minutes. If you have fans, place the fans in the windows and blow the air out of the room. Note: If the room has no windows, open all doors to the room and windows outside the room and use fans to move the air out of the room and to the open windows.
- (ii) Remove all materials you can without using a vacuum cleaner
- (iii) Wear disposable rubber gloves, if available (do not use your bare hands) • Carefully scoop up the fragments and powder with stiff paper or cardboard
- (iv) Wipe the area clean with a damp paper towel or disposable wet wipe
- (v) Sticky tape (such as duct tape) can be used to pick up small pieces and powder
- (vi) Place all cleanup materials in a plastic bag and seal it, and then place in a second sealed plastic bag, dispose it properly and wash your hands after disposing of the bags.
- (vii) The first time you vacuum the area where the bulb was broken, remove the vacuum bag once done cleaning the area (or empty and wipe the canister) and put the bag and/or vacuum debris, as well as the cleaning materials, in two sealed plastic bags in the outdoor trash or protected outdoor location for normal disposal.

**User Awareness:** All the consumers, individual domestic consumers and bulk consumers (offices, institutions, large residential complexes, etc.) should get fully aware about the potential health impact of mercury-bearing lamps, through audio-visual media and the product leaflets. The precautions, to be taken while cleaning up the broken FLs should, also, be known to the consumers. As a part of such awareness programs, the consumers, even at individual level, are expected to participate actively with constructive suggestions and provide the feedback, for the overall success of mercury management in fluorescent lamp

**Collection:** The collection of used lamps may be done mainly by two ways: (i) Collection of used lamp (FLs) from bulk consumers may either be arranged by the management of above set-up (institutions, etc.) for direct disposal to LRU or by the LRU which may arrange to pick up used

lamps from such collection sites through an identified collection agency. (ii) Collection of used lamps (FLs) from individual domestic consumer may be arranged by the LRU, either through kabaris (individuals appointed for the purpose by LRU) or an identified collection agency for door to door pickup. Transportation: (i) The Handler (e.g. Kabari or representative of LRU) of used FLs in transit should take care of selection of proper vehicle and carriage so as to minimize breakage of used FLs.

(ii) There should not be any intermediate transfer of materials in the transit stage. The collected used FLs should be straight transported to the LRF for further processing. (iii) The Handler should be trained to take care of mercury spills, if any, that takes place en-route the journey to LRU.



### **Health Audit :**

There are no health issues experienced by staff and students by virtue of their presence in campus.

The details divulged by Medical officer of University is as given here under.

### 3. Main ailments are

Cold

Fever

Sprain

Minor injury

Pain abdomen

Skin related allergy

UTI

URI

4. No any particular occupational type diseases noticed.

5. Bio medical wastage are generally in University Health Centre is as follows-:

Cotton swab

Gauze pieces

Band aid

Syringes

Common wastage (like- paper,  
empty container)

6 There is not much wastage generated in UHC, So University is having tie-up with Metro hospital, This work is being done on the request of Medical Officer (Part Time) who is visiting consultant of our University from Metro Hospital These services are being provided us on free of Cost.


7. We compliances with Biomedical wastage management rule 2016.

**Red dustbin:-** Wastage of cotton and gauze pieces.

**Blue dustbin**:- syringes, gloves,infected plastic waste.

**Yellow dustbin** :- pathological waste.

**Green dustbin** :- non infected waste.

  
Medical Officer  
J.C. BOSE University Science  
& Technology, YMCA Faridabad

## Noise Pollution

### 1. Sounds of Normal Conversations:

**Sound Intensity:** 40-60 dB

**Health Hazard:** Sound less than 80 dB is safe for the ear.

### 2. Sounds emanating from Tape recorders or an Orchestra:

**Sound Intensity:** 70 dB

**Health Hazard:** It is safe for ear.

### 3. Sounds of Heavy Traffic:

**Sound Intensity:** 90 dB

**Health Hazard:** Constant exposure to sound greater than 80 dB causes temporary hearing loss and if they are not treated immediately, causes permanent impairment.

### 4. Sounds of Pneumatic drills and other machines:

**Sound Intensity:** 100 dB

**Health Hazard:** Constant exposure causes temporary hearing loss and if they are not treated immediately, causes permanent impairment.

### 5. Sounds of Aircraft engine:

**Sound Intensity:** 100-200 dB

**Health Hazard:** Higher noise level of 160 dB cause total deafness, rupturing eardrums, damaging inner ear. It also causes high blood pressure, ulcer in stomach, palpitation, nervous problems, irritation, anger, and affects pregnant women's embryo.

### 6. Sounds of Rockets during Take off:

**Sound Intensity:** 200 dB

**Health Hazard:** It is dangerously causing total deafness by rupturing the eardrums and damaging the inner ear. It also causes high blood pressure, ulcer in stomach, palpitation, nervous problems, irritation, anger, and affects pregnant women's embryo.

### DECIBILE MEASUREMENT - YMCA

Sno	Location	Decibel level Measurement	Remarks
1	Water Test Lab	46.5	Satisfactory
2	Water Test Lab	47	Satisfactory
3	E.E. Room	48	Satisfactory
4	MBA Block	57.4	Satisfactory
5	Vivekanand Conference Hall	51.9	Satisfactory
6	MBA Block Lecture Hall	55.2	Satisfactory
7	Construction Site	66.3	Satisfactory
8	Mechanical Department	52.7	Satisfactory
9	Civil Department	51.3	Satisfactory
10	RAC Lab	55.4	Satisfactory
11	Boys Hostel	53	Satisfactory
12	Girls Hostel	51	Satisfactory
13	Computer Lab	52.7	Satisfactory
14	IT Class Room	51.3	Satisfactory
15	Physics Lab	61.1	Satisfactory
16	Chemistry Lab ( E - 202 )	50.2	Satisfactory
17	M. Sc. Environmental Science Lab	58.2	Satisfactory
18	Chemistry Lab ( F - 11 )	47.8	Satisfactory
19	Electrical Maintenance Lab	54.2	Satisfactory
20	Kitchen Garden	58.1	Satisfactory
21	VC Office	52.4	Satisfactory
22	Mechanical Workshop	52.1	Satisfactory

**Sound/Decibel level measured is satisfactory and there is no adverse impact of the same on occupants.**

### CUSTODIAL CHEMICAL USE

Chemical for one year requirement are used in Labs and these are stored in a separate store. The store requires to be ventilated and hazard analysis should be got done through Material Specification Data Sheet and record should be maintained. Proper ventilation with hoods should be designed.

## **TRANSPORTATION PRACTICES**

Most of students are using shared transport , DMRC station is at walk able distance from university, which is sustainable. Students are using Buses, Shared auto. There is only one bus owned by the university. The consumption of HSD by buses is monitored for optimised consumption.

Teaching and Non Teaching faculty is also sensitized for using pooled transportation for working towards sustainability and reducing resource use and encouragement of resource conservation.

## **PROCUREMENT PRACTICES TO BE FOLLOWED**

Procurement team is required to be made aware regarding procurement of goods and services that are sustainable. The sensitization is required for all purchases in a way that optimized utilisation of natural resources is possible.

- 1 Paper with Recycle content
2. AC's using refrigerant with Zero ODP Refrigerant
3. Environmental friendly Housekeeping Chemicals
4. Paints, Adhesives, sealants with recommended percentage of volatile organic compound.

## **PAPER USE AND PRINTING GOALS**

1. There are efforts already directed through use of E-Books for reducing the use of paper.
2. There are instructions to staff and student to resort to printing only iif it is absolutely un avoidable.
3. Papers should be purchased that have recycled content.

## What Happens To Paper after It Is Recycled

When pulped paper is recycled, it is used to help manufacture new products. There are many different uses for recycled paper, and the products made from recycled paper actually cost about the same as those made from other resources. You can do your part for the environment by purchasing recycled goods, and you won't be spending much, if any, extra money to do so. What are some of the products made from recycled paper?

2. **Office Paper.** This is probably the most obvious use for recycled paper. It can be found in several different colors and weights at most office supply stores.
3. **Toilet Paper and Tissues.** These items are made from white and coloured recycled papers. Processors rinse them several times to remove dyes and then sanitise them. Many are also bleached, which is not particularly environmentally-friendly. However, you can buy natural coloured toilet paper and tissues.
4. **Paper Towels and Napkins.** Yes, your recycled confidential documents can become a paper napkin to be used at someone's birthday party.
5. **Greeting Cards.** Greeting card companies are getting into the recycling game more and more. Recycled paper is used for everything from birthday cards to invitations. If you want to buy cards made from recycled office paper, check the back of the card. It should say whether or not it is made from recycled paper.
6. **Cardboard.** This handy material is used to package many different items, including cereal, eggs, pizza and your latest online order. And yes, cardboard is made with recycled office paper. Take a look at the carton of eggs next time you shop – if it's made from recycled paper, it will be labelled.
7. **Magazines and Newspapers.** Many of these reading materials are printed on recycled paper. Not sure if your daily newspaper is using recycled materials? Give them a call! And make sure to throw that newspaper into the recycling bin when you're finished with it.



## **Paper use and Printing Goal to be followed**

1. Distribute memos, reports, purchase orders and brochures electronically. Research electronic Purchase Orders for small amounts of money and “electronic signatures” for larger Pos
2. Encourage re-use of scrap paper for printing and note taking. Larger printers should have one dedicated tray for the reuse of scrap paper.
3. Print on letterhead paper only as needed; use electronic letterhead whenever possible
4. Network all printing to shared copiers/printers and eliminate stand-alone printers where possible
5. Discourage reckless printing and copying by requiring use of an account/password
6. Promote a ‘Think before you Print’ culture
7. Desktop drafting and editing of documents
8. Reduce default margin settings
9. Use toner-saving fonts (eg. EcoFont) or smaller-sized fonts
10. Single-spaced formatting on all documents - Include the “think before you print” message in the “green” PR Campaign
11. Encourage increased use of Blackboard as a paper-free resource
12. Training and Adherence - Distribute (an) email(s) with detailed instructions, including “screen shots” on how to change settings on computers, copiers, faxes, printers
13. Establish duplex (two-sided) copying and printing as standard
14. Phase out meeting handouts and distribute/project them electronically (this needs to be better defined).
15. Digitize forms and administrative processes. Continue replacing paper based processes and administration.
16. Widespread adoption of print management / print-saving software (eg. Green Print). Identify volunteers (including Sustainability Council and VP for Finance and Admin) to participate in a 30 day trial to explore the benefits (savings, functionality and ease of use) of Green Print Software. Find ways to test this in student labs & other high-volume print areas
17. Double-sided student assignments as standard (with electronic submission, grading & return)
18. Faxes: phase out fax machines, utilize computer faxing, end use of fax cover pages (research applicable technology/software: Win fax? E-fax?)
19. Increase electronic archiving and record keeping (this needs to be better defined and targets identified; work with Purchasing, Personnel, Academic Department and/or Student Records to be determined)

## **E-Library**

### **E-books v/s Traditional books data and year wise history to moving from traditional to E-system.**

**There is constant endeavour to promote use of E-Books which is a very positive effort.**

Despite fewer in numbers the e-books have advantage of being used by multiple students/ faculty simultaneously and thus creating better impact on sustainability in contrary to hard copy that can be read by only one person at a time.

The following recommendations are made

1. Use of E-books be promoted for students and faculty members specially in present Covid situation.
2. No. of E-books made available should be increased continuously.
3. Training on sustainability should be provided.
4. Adaption be promoted considering it to be a new normal.
5. Targets for increasing E-books should be fixed on continual basis.

### **Training and Awareness**

The university is regularly conducting awareness program for students and faculty members.

### **Governance**

Through enactment Waste Management and Green Initiative policy and its circulation to all stake holders, sustainability can be achieved. The results are regularly required to be verified at Periodical intervals. These can be managed through internal or external audits.

# PLANTATION AT JC BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY YMCA FARIDABAD

YMCA -FARIDABAD

## Plantation Inventory

क्र.सं.	पौधे का नाम	प्रकार	आकार
1	V.C. इंग्लिश Y.M.C.	पिपल	1-80
2	-cu-	पिपल	4-10
3	-cu- पाक	श्री	1-30
4	-cu- -cu-	श्री	0-60
5	-cu- -cu-	श्री	2-70
6	-cu- -cu-	श्री	1-30
7	-cu- -cu-	श्री	1-60
8	-cu- -cu-	श्री	1-00
9	M.B.A. इंग्लिश Y.M.C.	उत्तम	0-70
10	-cu- -cu-	उत्तम	0-60
11	-cu-	उत्तम	1-30
12	-cu-	उत्तम	0-70
13	-cu- इंग्लिश Y.M.C.	उत्तम	1-00
14	द्वारा इंग्लिश Y.M.C.	उत्तम	1-30
15	-cu-	उत्तम	1-70
16	-cu-	श्री	3-30
17	-cu-	उत्तम	1-10
18	-cu-	उत्तम	1-10
19	-cu-	श्री	0-40
20	-cu-	श्री	1-80
21	-cu-	उत्तम	1-00
22	-cu-	उत्तम	0-67
23	-cu-	उत्तम	1-10
24	-cu-	उत्तम	1-60
25	-cu-	श्री	1-70
26	-cu-	उत्तम	0-70
27	-cu-	उत्तम	1-00
28	-cu-	उत्तम	1-50
29	-cu-	उत्तम	1-10
30	-cu-	श्री	1-70
31	-cu-	श्री	0-60
32	-cu-	श्री	0-40
33	-cu-	श्री	0-30

क्रमांक	प्रकार का नाम (अक्षर संकेत)	पुस्तक नाम	पुस्तक की गोलार्ध	वर्ष 201
	रवलपुर 211 का 24012	सामान्य	11-500	
35	-cu-	सामान्य	0-30	
36	-cu-	सामान्य	0-40	
37	-cu-	सामान्य	0-40	
38	-cu-	सामान्य	0-30	
39	-dl-	अभिलेख	0-70	
40	-cu-	केशिमा प्रभाग	1-00	
41	-cu-	केशिमा प्रभाग	0-90	
42	-cu-	केशिमा प्रभाग	0-80	
43	-cu-	अज्ञान	0-67	
44	-cu-	नीम	0-56	
45	-cu-	प्रशिक्षण	1-50	
46	-cu-	केशिमा प्रभाग	0-40	
47	-cu-	प्रशिक्षण	1-20	
48	-cu-	केशिमा प्रभाग	0-80	
49	-cu-	केशिमा प्रभाग	0-86	
50	-cu-	प्रशिक्षण	1-10	
51	-cu-	केशिमा प्रभाग	0-67	
52	-cu-	केशिमा प्रभाग	0-80	
53	-cu-	केशिमा प्रभाग	0-60	
54	-cu-	पापुड़ी	0-60	
55	-cu-	केशिमा प्रभाग	0-60	
56	-cu-	बुद्ध	1-10	
57	-cu-	केशिमा प्रभाग	0-50	
58	-cu-	केशिमा प्रभाग	0-70	
59	-cu-	बुद्ध	1-70	
60	-cu-	पापुड़ी	0-50	
61	-cu-	केशिमा प्रभाग	1-00	
62	-cu-	केशिमा प्रभाग	0-70	
63	-cu-	केशिमा प्रभाग	1-20	
64	-cu-	केशिमा प्रभाग	1-60	
65	-cu-	नीम	0-55	
66	-cu-	सहजान	0-80	

क्र.सं.	प्राप्तिका नाम (जैव पौ. संक.)	पौ. का नाम	पौ. गोल. सं. m cm
67	खैल गु/का.स YML फारीदपुर	खैल/का.	0-50
68	—cu—	नीम	1-40
69	—cu—	कड़िया/ब्रह्मा	1-00
70	—cu—	अरुण	1-50
71	—cu—	खैल/का.	0-40
72	—cu—	नीम	1-20
73	—cu—	नीम	1-60
74	—a—	अरुण	0-80
75	—cu—	काशीक	1-10
76	—cu—	नीम	1-20
77	—a—	सहमल	1-46
78	—cu—	नीम	1-00
79	—cu—	नीम	1-00
80	—cu—	नीम	0-67
81	—a—	नीम	0-70
82	—cu—	नीम	0-73
83	मैत्र गे/रोट सडिस YML PABO	कुआम	0-60
84	—a—	गुलमोहर	1-30
85	—cu—	गुलमोहर	1-10
86	—cu—	नीम	0-60
87	—a—	गुलमोहर	1-40
88	—a—	नीम	0-68
89	—cu—	गुलमोहर	0-80
90	पार्क रील मैस घटल	नीम	0-36
91	—cu—	गुलमोहर	1-10
92	—cu—	कड़िया/ब्रह्मा	0-48
93	—a—	पिलरुव/	2-00
94	—cu—	अरुण	1-30
95	—cu—	कड़िया/ब्रह्मा	0-50
96	—a—	कड़िया/ब्रह्मा	0-46
97	—cu—	कड़िया/ब्रह्मा	0-40
98	—cu—	अरुण	1-20

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क्र.सं.	पुस्तक का नाम	लेखक का नाम	पृ.सं.
99	Urm Sita Sita Sita YMC Food	पुस्तकालय	1-50
100	— a —	पापुडी	0-40
101	— a —	जापान	0-80
102	— a —	स्टेज/	0-62
103	— a —	बुक्स	4-50
104	— a —	संविधान/भारत	0-43
105	— a —	इंग्लिश/लार	0-30
106	— a —	भारत/काल	0-65
107	— a —	गीत	1-50
108	— a —	भारत/काल	0-90
109	— a —	भारत/काल	0-70
110	— a —	गीत	2-00
111	— a —	पिण्ड/काल	1-70
112	अन्य पुस्तकें YMC काल	गीत	1-50
113	— a —	भारत/काल	0-40
114	— a —	भारत/काल	0-30
115	— a —	गीत	0-30
116	— a —	गीत	0-50
117	— a —	इंग्लिश/काल	0-50
118	— a —	इंग्लिश/लार	0-50
119	— a —	गीत	1-50
120	— a —	पापुडी	0-60
121	— a —	पिण्ड/काल	2-85
122	— a —	इंग्लिश/लार	0-40
123	— a —	गीत	1-70
124	— a —	बुक्स	2-50
125	— a —	पापुडी/देवी	0-40
126	— a —	पापुडी	0-70
127	— a —	पिण्ड/काल	1-40
128	— a —	पापुडी	0-60
129	— a —	पापुडी	0-80
130	— a —	पिण्ड/काल	2-00

क्र.सं.	वर्क का नाम	वर्क का नाम	वर्क का नाम	वर्क का नाम
131	कार 25 YMC मरीचक	इंधन	1-20	
132	-cu-	इंधन	1-10	
133	-cu-	इंधन	0-80	
134	-cu-	इंधन	0-20	
135	-cu-	इंधन	0-60	
136	-cu-	इंधन	1-20	
137	-cu-	इंधन	0-70	
138	-cu-	इंधन	1-40	
139	-cu-	इंधन	0-40	
140	-cu-	इंधन	0-40	
141	-cu-	इंधन	1-90	
142	कार 2 कार 2 के माल रोड	इंधन	2-30	
143	-a-	इंधन	0-50	
144	-a-	इंधन	1-70	
145	-a-	इंधन	1-10	
146	-a-	इंधन	1-30	
147	-a-	इंधन	0-90	
148	-a-	इंधन	0-70	
149	-a-	इंधन	0-50	
150	-a-	इंधन	0-40	
151	-a-	इंधन	0-20	
152	-a-	इंधन	1-90	
153	कार 2 कार 2 के माल रोड	इंधन	3-20	
154	-cu-	इंधन	1-20	
155	कार 2 कार 2 के माल रोड	इंधन	1-20	
156	-a-	इंधन	0-80	
157	-a-	इंधन	1-50	
158	-a-	इंधन	1-40	
159	-a-	इंधन	0-50	
160	-a-	इंधन	1-20	
161	-a-	इंधन	0-50	
162	-a-	इंधन	1-20	

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### **Plantation Program**

JC BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY - YMCA has regular plantation program and given above is the plantation Inventory of different type of plant and trees.

There is regular addition of tress/plants.

Total Trees and Plants presently existing in YMCA-JC BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY is as above.

### **Air Quality**

#### **CPCB GUIDELINES**

**Exhaust of DG Sets are required to be raised as per CPCB requirement.**

There is no record of air quality testing done earlier. Generally the dust level is found to higher than normal and is causing abnormal conditions.

As per WHO guidelines the following should be the limits for Air Quality

#### **Particulate matter**

Guidelines	
<b>PM<sub>2.5</sub>:</b>	<b>10 µg/m<sup>3</sup> annual mean</b> <b>25 µg/m<sup>3</sup> 24-hour mean</b>
<b>PM<sub>10</sub>:</b>	<b>20 µg/m<sup>3</sup> annual mean</b> <b>50 µg/m<sup>3</sup> 24-hour mean</b>

<b>AIR DATA –Random Recording - YMCA</b>								
<b>S No.</b>	<b>Location</b>	<b>PM-2.5</b>	<b>PM-10</b>	<b>Particles</b>	<b>Remarks-PM</b>	<b>CO2</b>	<b>NCHO-Formaldehyde</b>	<b>Remarks-NCHO and CO2</b>
1	Water Test Lab	347.3	533.6	36741	Very High	847	0.001	Satisfactory
2	E.E. Room	348.5	528.8	39734	Very High	1484	0.001	Satisfactory
4	MBA Block	476.2	744.7	52041	Very High	784	0.197	Satisfactory
5	Viveka Nand Conference Hall	496.9	764.9	45826	Very High	766	0.11	Satisfactory
6	MBA Block Lecture Hall	386.3	584	41192	Very High	773	0.139	Satisfactory
7	Construction Site	393.2	612.3	40867	Very High	674	0.037	Satisfactory
8	Mechanical Department	342.1	533.2	44077	Very High	680	0.055	Satisfactory
9	Civil Department	382.8	588.3	41959	Very High	693	0.61	Satisfactory
10	RAC Lab	344	530.7	37110	Very High	701	0.08	Satisfactory
11	Boys Hostel	380.4	591.4	43285	Very High	677	0.029	Satisfactory
12	Girls Hostel	320.3	494	35457	Very High	703	0.001	Satisfactory
13	Computer Lab	297.5	456	31563	Very High	669	0.222	Satisfactory
14	IT Class Room	339.7	518.3	35124	Very High	672	0.014	Satisfactory
15	Physics Lab	305.5	463.7	32433	Very High	673	0.064	Satisfactory
16	Chemistry Lab ( E - 202 )	318.1	482	33848	Very High	731	0.02	Satisfactory
17	M. Sc. Environment Science Lab	331.5	512.7	35427	Very High	728	0.085	Satisfactory
18	Chemistry Lab ( F - 11 )	349.5	543.2	37631	Very High	808	0.055	Satisfactory
19	Electrical Maintenance Lab	287.7	433.7	32550	Very High	709	0.157	Satisfactory
20	Kitchen Garden	297	460	32611	Very High	691	0.012	Satisfactory
21	VC Office	404.7	636.1	44415	Very High	683	0.042	Satisfactory
22	Mechanical Workshop	436.6	696.5	40159	Very High	772	0.002	Satisfactory

The values of PM-2.5 and PM-10 are very high and limits are dangerous for human beings. Values of CO<sub>2</sub> and Formaldehyde are satisfactory. There is not much that can be done by University for management of particulate matter. Only any loose soil or construction material inside premises should be sprinkled with water to mitigate to some extent.

### Significance of Refrigerant for Environment

**Table depicting properties of Refrigerants**

Refrigerant	Global Warming Poetential	Ozone Depletion Potential
R 22	1810	Medium
R 410A	2088	Nil
R 32	675	Nil
R 134A	1430	Nil
R 290	3	Nil
R 600A	3	Nil

Refrigerant	Type	ODP	GWP	Atmospheric lifetime (years)
R12	CFC	0.9	8500	102
R22	HCFC	0.06	1700	13.3
R134a	HFC	0	1300	14
R407C	HFC blend	0	1610	36
R410A	HFC blend	0	1900	36
Ammonia (R717)	Natural compound	0	0	< 1
Propane (R290)	HC	0	3	< 1
R1234yf	HFC unsat.	0	6	Very low
R1234ze	HFC unsat.	0	6	Very low

## **Detail of Refrigerant used in installed Air Conditioners**

Data of Refrigerants not maintained. It is recommended that in future all procurement for AC's, Water cooler etc. be made with consideration for Environment friendly refrigerants.

### **Recommendations**

1. It is recommended that in future care should be taken to purchase Air conditioners with refrigerants for which GWP is low and ODP is nil.
2. Life cycle cost should be considered for making decision about purchase of Air Conditioners.
3. All AC's that were procured more than 8 years ago should be replaced with best in class energy efficient Air Conditioners after taking into consideration Life Cycle Cost. This will eliminate existing AC's impact on environment through low impact refrigerant and also with low consumption of Electricity thus reducing

## **ECO FRIENDLY HOUSE KEEPING MATERIALS**

Green Seal -37 compliant an International standard or Green Pro-CII certification

It is recommended that Eco Friendly material and Sustainable material as per NBC-2016 guidelines be procured and used.



**GreenPro Certification Standard for  
Cleaning Chemicals**

**Version 1.0**

## 2. *GreenPro Certification – Life Cycle Approach*

The Green Products Rating adopts a holistic approach based on the 'Life Cycle' of the product. The rating system encourages the product manufacturers to implement measures that would result in environmental, health and wellbeing benefits at the following stages of the life cycle of the products.

1. Product Design
2. Raw materials
3. Manufacturing Process
4. Product Performance during use
5. Disposal / Recycling



### For Users

Use of rated Green products leads to significant tangible and intangible benefits for the end users.

Some of the benefits for the users are highlighted as below:

1. Time and effort in carrying out due diligence in selecting a green product is saved
2. The user is assured of the performance of the product and equipment
3. Ensures Toxic and hazardous substances free products which in turn decrease "health and wellbeing" risks of the users
4. Improved product performance during use to reduce resource consumption and environmental impacts
5. Recognition and credits for achieving national and international Certification for the buildings

## **4. National Priorities addressed in Certification**

GreenPro Certification addresses the following which are priorities of the Government at the National level:

### *Water:*

Water is a major concern in most part of the country. Implementation of water efficiency measures and "zero Liquid Discharge" are being encouraged to address the water related issues.

### *Land:*

Availability of land and increase in land pollution are major areas of concern. The Certification system demands for increased recycling of material after use which would result in reduction in landfills and hence reduction in land pollution.

### *Energy Efficiency:*

The Certification system encourages the product manufacturers to adopt energy efficiency improvement measures and reduce their energy consumption which is in line with the National Mission on Enhanced Energy Efficiency. This also addresses

**The key objective of the council is to facilitate Green product market transformation in India through 'Green Product Certification'.**

The initial focus of the council will be on Green building products and related technologies. Over a period of time, the council will expand its focus to other areas such as Industrial products, consumer items, services etc.

### **Why GreenPro Certification?**

The GreenPro Certification is a tool for facilitating Green Product market transformation in the country. The GreenPro Certification is expected to:

1. Enable green building projects in selecting the right product and equipment
2. Increase the market demand for the Green products
3. Put a system in place for a product to be called 'green'

Eliminate exposure to prohibited substances that can lead to long term health effects either through respiration / direct contact.

Mandatory Requirement Manufacturer to provide Material Safety Data Sheet (MSDS) for the products.

The MSDS should have the following details:

1. Chemical Identify
2. Manufacturer's information
3. Hazardous ingredients / Identify information
4. Physical, Chemical characteristics
5. Fire and explosion hazard data
6. Reactivity data
7. Health hazard data
8. Precautions of safe handling and use
9. Control measures
10. Emergency and first aid procedures



## General Purpose Cleaners

**Presently there is no practice for procurement of Eco Friendly chemical .**

Eco friendly housekeeping materials are recommended to be used for all cleaning application should be Green Pro or any similar Indian standard should be procured in future and records of such procurement b documented for future references.

The cleaning material may be required for following applications and also may be some other in addition to these.

1. Glass Cleaners
2. Bathroom Cleaners
3. Disinfectants and Sanitizers
4. Cleaner/Degreasers
5. Carpet and Upholstery Cleaners
6. Floor Cleaners
7. Liquid Hand Soap
8. Furniture Polish

## Ventilation assessment

**The areas constructed have been provided with adequate windows and ventilators have been provided @ more than 6% of floor area.**

Area of Room					Area of openable windows					
S N o	LOCATION	Length in mtr.	Width in mtrs	Total Area in Sq mtrs	Length in mtrs	Width in mtrs	QTY of Windo ws	Tota l Are a in Sq mtr s	Percent age- openabl e window s as function of floor area	Remarks
1	Viveka Nand Conference Hall	8.5	8	68	0.47	1.5	4	2.82	6.22	Sufficient Ventilation
					0.47	1.5	2	1.41		
2	MBA Block Lecture Hall	9.75	8.5	82.87	0.47	1.5	6	4.23	6.81	Sufficient Ventilation
					0.47	1.5	2	1.41		
3	Mechanical Lab	9.75	8.5	82.87	0.47	1.5	6	4.23	5.10	Slightly lower Ventilation
4	Civil Department Class Room	9.75	8.5	82.87	0.47	1.5	6	4.23	5.10	Slightly lower Ventilation
5	RAC Lab	9	6	54	0.47	1.6	8	6.01	11.14	Sufficient Ventilation

6	Boys Hostel	4	3	12	0.5	1.5	5	3.75	31.25	Sufficient Ventilation
7	Girls Hostel	5	3	15	0.47	1.2	2	1.128	17.52	Sufficient Ventilation
					0.5	1.5	2	1.5		Sufficient Ventilation
8	Computer Lab	12	6.5	78	0.47	1.5	8	5.64	7.23	Sufficient Ventilation
9	IT Class Room	12	6.5	78	0.47	1.5	8	5.64	7.23	Sufficient Ventilation
10	Physics Lab	10	6	60	0.47	1.5	10	7.05	11.75	Sufficient Ventilation
11	Chemistry Lab ( E - 202 )	11.5	6	69	0.47	1.5	12	8.46	12.26	Sufficient Ventilation
12	M. Sc. Environmental Science Lab	12	6.5	78	0.47	1.5	12	8.46	10.85	Sufficient Ventilation
13	Chemistry Lab ( F - 11 )	6	3.25	19.5	0.47	1.5	6	4.23	21.69	Sufficient Ventilation
14	Electrical Maintenance Lab	12	6.5	78	0.47	1.5	12	8.46	10.85	Sufficient Ventilation
15	Mechanical Workshop	40	30	1200				0	0.00	Ventilation from Roof Top-Sufficient

### Fire Safety :

No halon based fire extinguishers have been used , it is very good initiative.. As a future guideline It is recommended that of fire suppression system is to be used for any fire extinguishing system, only clean agents with minimum environmental impact should be installed.

## Sustainable Development Goals

Sustainable development should always be practiced in all activities of university.

# SUSTAINABLE DEVELOPMENT GOALS



## **Consideration for New Constructions**

For design of any new future construction the following points should be given consideration and weight age

1. Siting, form and design of building
2. External Development and Landscape
3. Envelope optimization
4. Shading of Building
5. Cool Roof practices
6. Sustainable Material
7. Water and Waste management
8. Building Services Optimization

### **The following construction practices should be followed for future construction**

The framework for sustainable construction practices includes the following issues:

1. Pre-construction pre-requisites;
2. Planning for sustainable construction; demolition.
3. Planning, monitoring and control of environmental descriptors;
4. Sustainable work execution procedures;
5. Effective use of water;
6. Construction waste management ;
7. Post-construction closeout;
8. Alternative use, de-construction, dismantling
9. Procurement Policy
10. Contractual Obligations towards Sustainable Construction
11. Identification of Sustainability Issues During Construction
12. Construction methods review and impact on sustainability
13. Consideration to environmental impact assessment

### **Considerations to social impact assessment**

1. Prevention and management of construction accidents
2. Establishing Energy Consumption Data
3. Collection, Analysis, Documentation System and
4. Creating Benchmarks
5. Monitoring of performance of management systems and
6. Location of Infrastructure for Labourers
7. Providing fire and life safety measures during construction

### **Water and Waste Management During Construction**

1. Water Use During Construction
2. Control and Use of De-Watering Output
3. Management of Waste Water

### **Recycling**

Rate of Re-cycling should be monitored and maximised to extent possible.

Conservation and Restoration Activities should always be preferred.

### **Use of natural resources and replacement of chemicals as much as possible**

As far as possible avoid use of Chemicals and use natural resources.

### **Encourage use of local materials**

Always encourage use of locally available material. With this we will help local population and their Social Development Index will get a boost. Also low energy shall be expanded on transportation that will ultimately save fossil fuels and make decision of an organization more sustainable.

### **Low VOC (Volatile organic compound )%**

#### **The following material contains VOC**

1. Paints
2. Adhesives
3. Sealants
4. Other materials

It should be ensured that while procurement or issuing PO's for work it should be ensured that only material with permitted percentage of VOC are procured or used in of works awarded. Special conditions in contract/specifications shall be incorporated.

Team responsible for PMC shall ensure that material brought to site and used in execution of work is in compliance to Green specifications.

## Use of Low Impact material and Zero ODP material

Where ever relevant and applicable care should be taken to include in specifications use of low impact material and only zero ODP material shall be procured or used in execution of works by contractors/Vendors.

## Guidelines for Environment Friendly and Green Initiatives

### Annexure I

#### VOC limits of materials

Type of Material	VOC Limit (g/L less water)
<b>Paints</b>	
Non- Flat (Glossy) paint	150
Flat (Mat) paint	50
Anti- corrosive/ anti-rust paints	250
Varnish	350
<b>Adhesives</b>	
Glazing adhesives	100
Tiles adhesives	65
Wood adhesive	30
Wood flooring adhesive	100

## Minimum Ventilation Rates in Various Functional Zones\*

Occupancy Category	People Outdoor Air Rate	Area Outdoor Air Rate
	Cfm/person	Cfm/ sq.ft
<b>Correctional Facilities</b>		
Dayroom, Guard station	5	0.06
Booking/ waiting	7.5	0.06
<b>Education Facilities</b>		
Daycare (through age 4), daycare sickroom, Art Classroom, science laboratories, college laboratories, wood, metal shop	10	0.18
Classrooms (ages 5-8), (age 9+), computer lab, media centre	10	0.12
Lecture Room/ hall (fixed seating)	7.5	0.06
Music/ theater/ dance,	10	0.06
Multi use assembly	7.5	0.06
<b>Food &amp; Beverages Services</b>		
Restaurant dining rooms/ cafeteria/ fast food dining/ Bars/ Cocktail Lounges	7.5	0.18
<b>General</b>		
Break Rooms, Coffee stations, conference/ meeting	5	0.06
Corridors	-	0.06
Storage Rooms	-	0.12
<b>Hotels, Motels, Resorts, Dormitories</b>		
Bedroom/ living room, barracks sleeping areas	5	0.06
laundry rooms	5	0.12
Lobbies/ prefunction	7.5	0.06
Multipurpose assembly	5	0.06

<b>Occupancy Category</b>	<b>People Outdoor Air Rate</b>	<b>Area Outdoor Air Rate</b>
	<b>Cfm/person</b>	<b>Cfm/ sq.ft</b>
<b>Office Building</b>		
Office Spaces, Reception Areas, Telephone, data entry, Main entry Lobbies	5	0.06
Electrical Equipment rooms	-	0.06
Elevator machine rooms	-	0.12
Pharmacy (prep area)	5	0.18
Photo Studios	5	0.12
Shipping/ receiving	-	0.12
Telephone closets	-	0.00
Transportation waiting	7.5	0.06
Warehouses	-	0.06
<b>Public Assembly Spaces</b>		
Auditorium seating area, Place of religious worship, Courtrooms, Legislative Chambers, Lobbies	5	0.06
Libraries	5	0.12
Museums (children's)	7.5	0.06
Museum/ galleries	7.5	0.06
<b>Retail</b>		
Sales	7.5	0.12
Mall common Areas	7.5	0.06
Barber Shop	7.5	0.06
Beauty & nail salons	20	0.12
Pet Shops (animal areas)	7.5	0.18
Super Market, Coin operated Laundries	7.5	0.06



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Occupancy Category	People Outdoor Air Rate	Area Outdoor Air Rate
	Cfm/person	Cfm/ sq.ft
<b>Sports &amp; Entertainment</b>		
Sports arena (Play Area), Gym, stadium (play area)	-	0.30
Spectator area	7.5	0.06
Swimming (pool & deck)	-	0.48
Disco/dance floor/ health club/ aerobics room/ weight rooms	20	0.06
Bowling alley (seating)	10	0.12
Gambling casinos/ game arcades	7.5	0.18
Stages, studios	10	0.06

\* Total outdoor air flow in functional zone =

$$\left\{ \begin{array}{l} \text{Outdoor air flow rate required per} \\ \text{person as per the above table} \\ \times \\ \text{Zone population} \end{array} \right\} + \left\{ \begin{array}{l} \text{Outdoor air flow rate required per unit} \\ \text{area as per the above table} \\ \times \\ \text{Net occupiable zone area} \end{array} \right\}$$

## APPENDIX 5B: LANDSCAPE WATER DEMAND REDUCTION

**Table 1** Plant factor for various species

Plant species	Plant factor
Lawns	1
Native grass	0.45
Existing native trees	0
Newly planted native shrubs	0.3
Newly planted exotic shrubs	0.9
Newly planted native trees	0.15
Newly planted exotic trees	1.65

Plant species	Plant factor
Vertical gardens	0.35
Newly planted native shrubs on podium	1.3
Newly planted exotic shrubs on podium	1.9
Newly planted native trees on podium	1.15
Newly planted exotic trees on podium	2.65

**Note:** For potted plants, calculate the water requirement as volume of pot and divide it by 4.

**Table 2** Irrigation system efficiency

Type of Irrigation system	Efficiency (%)
Flood	65
Furrow	80
Sprinkler	85
Drip	90

**PHOTOGRAPHS-ENVIRONMENTAL CONCERNS**

**PHOTOGRAPHS DEPICTING ISSUES RELATED TO GREEN AND ENVIRONMENT  
AUDIT-JC BOSE UNIVERSITY OF SCIENCE AND TECHNOLOGY-YMCA-  
FARIDABAD**



Herbal and Kitchen Garden maintained in premises-Good Practice.



There is Mud Phaska tiled roof all over in premises. The top terrace can be covered with China tiles with appropriate SRI to make top floor more comfortable and savings in Energy use if area is Air Conditioned and make the area comparatively better in terms of comfort of occupants in case the area is not Air Conditioned.



Rain Water harvesting Pits-As informed due to low lying area there is no run-off from premises during peak rain also. The Rain water harvesting pits be regularly maintained.



Exhaust hoods of Labs not raised to level above building. The final exhaust should be raised above building for proper dispersion of fumes.



PREFERRED BINS



Stack of DG sets are not as per requirement of CPCB Guidelines. These are required to be taken above height of building and stack height should be as following formula

Ht. of Stack = Ht of Building+ 0.2 \* sq. root of kVA of DG set