



LADY IRWIN COLLEGE

WATER AUDIT REPORT

2021-2022

PREPARED BY
EHS ALLIANCE SERVICES



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CERTIFICATE



AUDIT CERTIFICATE

PRESENTED TO

LADY IRWIN COLLEGE

Sikandra Road, Mandi House, New Delhi, 110001

Has been assessed by EHS Alliance Services for the comprehensive study of water consumption and its impacts on institutional working framework to fulfill the requirement of

WATER AUDIT

The water conservation initiatives carried out by the institution have been verified on the report submitted and was found to be satisfactory.

The efforts taken by the management and the faculty towards environment and sustainability are appreciated and noteworthy.

AUDITOR SIGNATURE



25.11.2022
DATE OF AUDIT

EHS ALLIANCE SERVICES, PLOT A-72, SURYA VIHAR, GURUGRAM, 122001
WWW.EHSALL.IN | BUSINESS@EHSALL.IN | EHSALLIANCE@GMAIL.COM

ACKNOWLEDGEMENT

EHS Alliance Services would like to thank the management of Lady Irwin College, New Delhi for assigning this important work of Water Audit. We appreciate the co-operation to the teams for completion of assessment.

We would like to specially thank **Prof. Anupa Siddhu – Director, Lady Irwin College** for giving us an opportunity to evaluate the environmental performance of the campus.

We would also like to thank **Audit Conveners - Prof. Puja Gupta (Convener, NAAC Cr. VII), Prof. Meenakshi Mital (Convener, NAAC Cr. VII), and Dr. Meenal Jain (Member, NAAC Cr. VII)**, for steering the audit process, without which the completion of the project would not have been possible. We are also thankful to other staff members for their constant support in completing the compilation of data in a timely manner.

We are also thankful to

| | |
|----------------------|-----------------------------------|
| Prof. Sushma Goel | <i>Vice Principal</i> |
| Prof. Rupa Upadhyay | <i>Convener, Garden Committee</i> |
| Ms. Vishakha Sambhav | <i>Member, NAAC Cr. VII</i> |
| Ms. Shefali Chopra | <i>Member, NAAC Cr. VII</i> |
| Ms. Mitali Yadav | <i>Member, NAAC Cr. VII</i> |
| Mr. Rajneesh Dwevedi | <i>Member, Eco-club</i> |
| Ms. Seema Das | <i>S/O, Accounts Department</i> |
| Mr. Amit | <i>Administrative Department</i> |





DISCLAIMER

EHS Alliance Services Audit Team has prepared this report for Lady Irwin College based on input data submitted by the representatives of Lady Irwin College complemented with the best judgment capacity of the expert team.

While all sensible care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the conclusions are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

If you wish to distribute copies of this report external to your organization, then all pages must be included.

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EHS Alliance staff, agents and accreditation bodies have signed individual confidentiality undertakings and will only receive confidential information on a 'need to know' basis.

The image shows a handwritten signature in blue ink on the left. To its right is a circular blue ink stamp. The stamp contains the text "ALLIANCE SERVICES" around the top inner edge, "GURGAON" in the center, and "EHS" around the bottom inner edge.

Signature

LEAD AUDITOR



|| INTRODUCTION

A water analysis is an on-site survey and assessment of water-using hardware, fixtures, equipment, landscaping, and management practices to determine the efficiency of water use and to develop recommendations for improving water-use efficiency. In simple words, a water analysis is a systematic review of a site that identifies the quantities and characteristics of all the water usage. The site may differ from a public water utility, facility (institutional or commercial assets like office, college, university, malls, schools etc.) or even a household.

|| OBJECTIVE AND SCOPE OF WORK

The chief objective of the study is to classify the water uses & water saving opportunities.

Scope of work of the study includes the following:

- Water system analysis
- Baseline water mapping quantification
- Inefficiencies and leakage quantification
- Water quality loads and discharge quantification
- Flow variability and quality parameters quantification
- Approach for water treatment, reuse or direct use
- Water balancing
- Mapping of Water quality needs at different user areas



METHODOLOGY OF THE STUDY

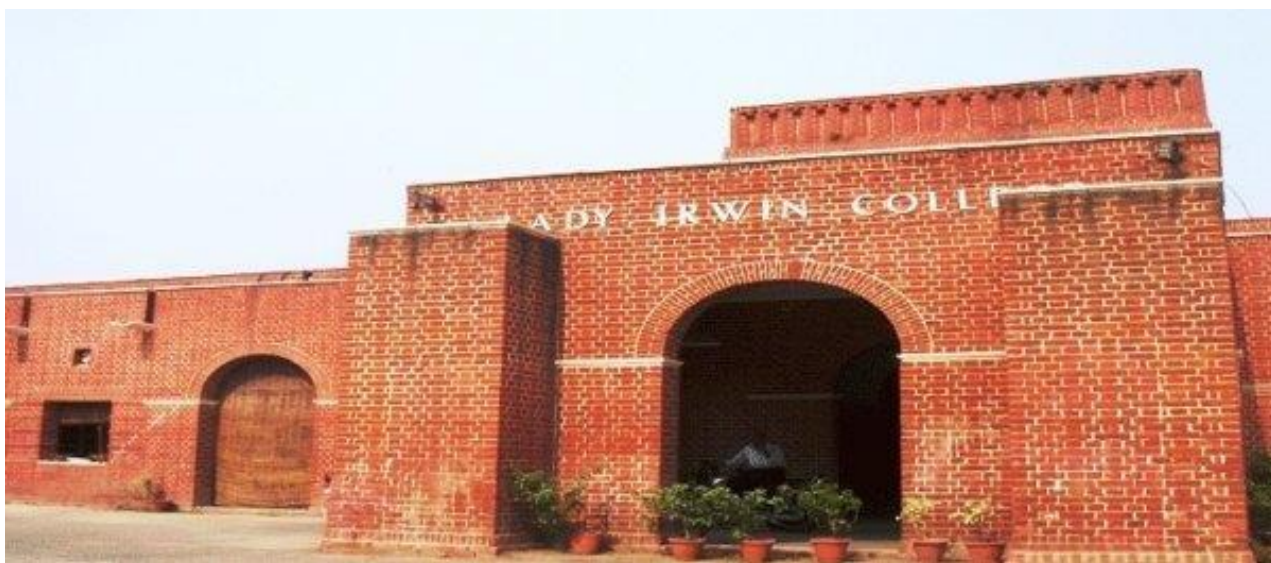
In this section brief about the methodology adopted for carrying out the study is to be discussed.

- Walk through the entire college to understand the nature of water uses and the systems installed in the building.
- Discussion with the administrative officers, housekeeping and kitchen employees on the various water uses during the day and the source of water.
- Regular discussions with the administrative department including the electrician, housekeeping and canteen incharge were conducted throughout the exercise on current situation and the past trends in water consumption, current sources, supply amount, source metering, distribution, storage, wastewater generation etc.
- Sample survey of Lady Irwin campus staff to estimate individual water consumption on sanitary and drinking purposes couldnot be completed because of the ongoing pandemic Covid-19. In an ideal case, when institutes are fully functional, then 10% of the total headcount undertakes a week long observation of their personal water use in toilets and for drinking. Thus the per capita average of personal water use is calculated for the audit.
- For other water uses in kitchen, gardening, mopping etc. primary data on time, patterns and frequency of water use was noted.
- The data collection and processing for personal water use including drinking, flushing and face/ handwashing, mopping, gardening, utensil washing etc. was done on the basis of actual consumption.
- One litre bottle and 10 litres bucket method was used to estimate the flow rate from various taps used for a variety of purposes. This was then calculated with the frequency of use to determine the actual water use.
- As part of the survey, staff members recorded the number of daily visits to, flushes in toilets and urinals, along with daily frequency of hand washing and average time of water flow from the taps.
- The data for all the above uses was calculated for varying time period for e.g personal water use survey by the Lady Irwin staff to calculate per capita use.



OVERVIEW OF THE COLLEGE

Lady Irwin College is a constituent college for women, in the University of Delhi, under the memorandum of Association of The Lady Irwin College Society vide Regd. Society Registration Act 1860 (Punjab Amdmt.) 1957 Registration No.4163 (1969-70) & maintained by the Governing Body & UGC Grants. Lady Irwin College is a premiere institution affiliated to University of Delhi for Undergraduate and Postgraduate education in Home Science. It also supports doctoral programs in five areas of Home Science. Other programmes are two year B.Ed. (for students of Home Science), B.Ed. Special Education MR (for students from all streams) and one year Postgraduate Diploma in Dietetics & Public Health Nutrition.



It aims for holistic development of women students, and their capacity building through carefully designed academic programmes and extramural activities.

The Lady Irwin College aphorism is VIDYA HI SEWA. The teaching learning transactions true to the motto Endeavour to inculcate a sense of knowledge to serve through carefully designed outreach experiences.

The College has always provided headship to other institutions in the nation in teaching, research and extension in Home Science, both at central universities and Home Science colleges with agricultural institutions.

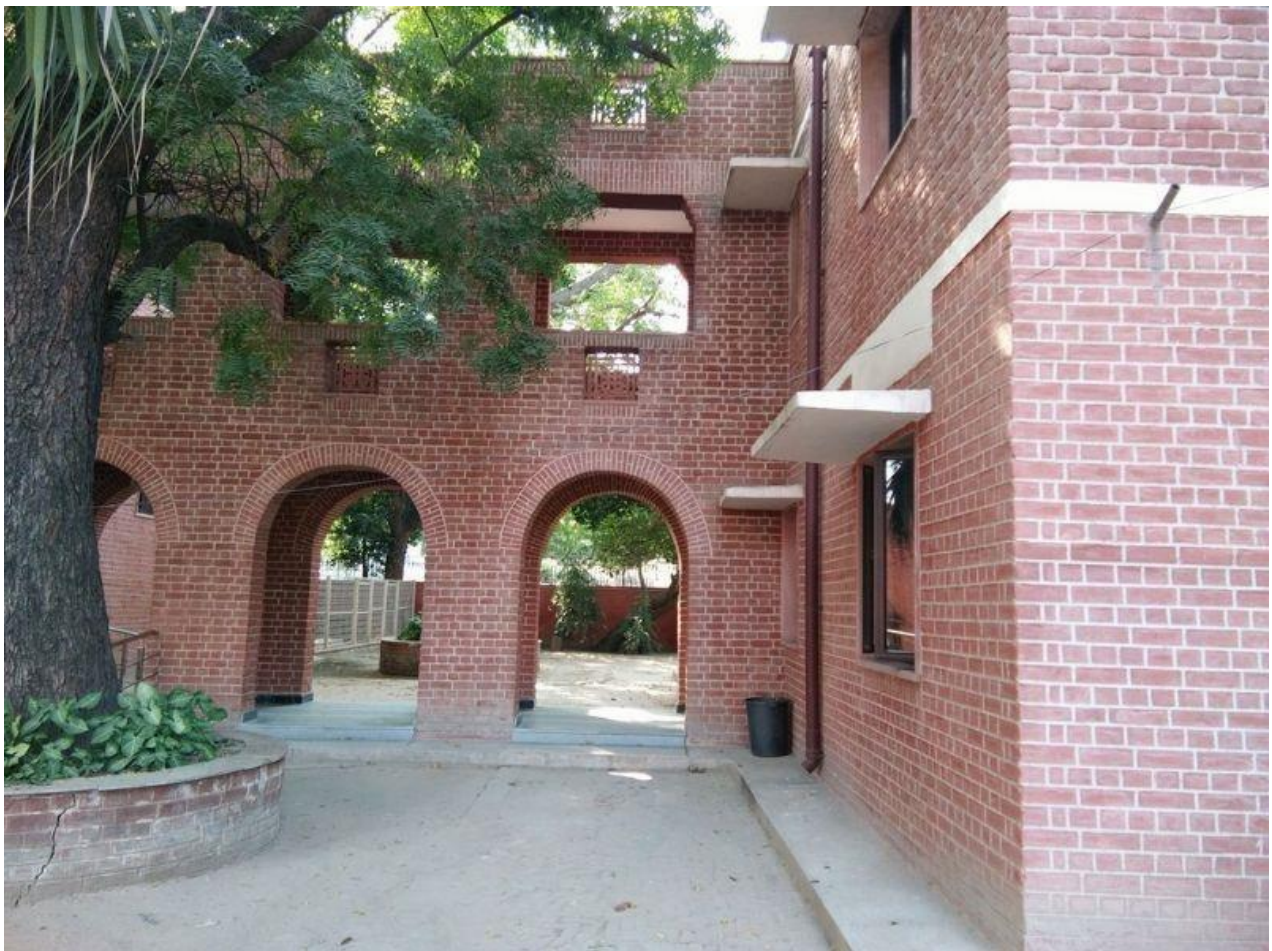
Lady Irwin College has celebrated 83 years in 2015. The education in this college aims towards capacity building for entrepreneurship, improved quality of life and overall development of the students. It is a nodal and template institution for Home Science education in the country.

The academic disciplines in the college are artistic, creative, culturally rooted and contemporary. The programmes are scientifically planned which include education in textile technology, food



processing, metabolism, environment, sustainable technologies, food safety, health and disease and human development. The focus of college is to have holistic education for the all round development of the students.

High standard of education is maintained in pedagogical strategies and course structuring by the faculty members. The curriculum is internationally competitive. The college hopes to improve the talent and nurture creativity among its students for playing positive role in the society.



VISION

Strives to inculcate the spirit of service along with professional development and skills for women empowerment through state of the art education, research and extension by nurturing innovation, leadership and national development.

Lady Irwin College has been a pioneer in women's education. Set up more than eight decades ago, the vision for empowering women continues to be the key thrust of the College. It is indeed a matter of pride for us that the Father of the Nation Mahatma Gandhi gave us our motto Vidhya Hi Sewa (service through knowledge). True to the motto, our educational endeavour has been to inculcate



the spirit of service along with professional growth of students. The college remains committed to building leadership, conscious citizenry and active participation of women for furthering national developmental goals. The college encourages the development of scientific temper with special focus on individual, family and community life. The education in the college aims towards developing creative and critical thinking, nurturing innovation and excellence. Lady Irwin sees its students building capacity to acquire global skills for entrepreneurship, professional proficiency and improved quality of life.

Eminent national and international leaders helped envision Lady Irwin College goals and the role it could play in the field of higher education for women. They built strong foundations based on core values of social justice, veracity, service and sustainability for achieving excellence in all spheres of life. These have continued to guide and contour the curricular and co-curricular thrusts of the college through the decades.

Since its inception, Lady Irwin College, has been a flag-bearing institute for Home Science education in the country, both at the school and college level and has always provided leadership to other institutions across the country. The knowledge, innovations, tenets and thrusts provided by the college over the years have percolated to put Home Science as a discipline on the academic map of India.

MISSION

The college faculty has consistently strived to contemporize its academic content through innovative research, strong community outreach and implementation of new technological knowledge in the field of Home Science. Every department of the college, along with developing core discipline specific skills among the students, also addresses larger societal issues like health, gender, conservation of textile heritage, socio-economic inequalities, community mobilization, people's participation, resource utilization, environment and education.

The curriculum helps young women students develop key life skills for their future professional and societal roles. Their experiences at college are designed to facilitate self-development and nurture them so that they become aware, active and enthusiastic members of the community and the nation at large. In a nutshell, through curricular and co-curricular activities at both UG and PG levels, we strive to:

- Accomplish training and development of young women for professional employment
- Generate an appreciation and respect for our cultural heritage and traditions with a critical orientation towards social and economic advancement
- Undertake training of trainers and educators
- Develop research and critical analysis skills for analyzing and suggesting national development strategies
- Strengthen linkages with other teaching and research institutions and professionals at all levels
- Give impetus to community outreach and extension



The courses at Lady Irwin strive to build a cadre of professionals:

- Focusing specifically on issues, programmes and policies of health and well-being of children, women and families
- Nutrition, dietetics, food processing, food safety and security
- Heritage textiles, textile technology and apparel design
- Early childhood care and education, parenting, family counselling
- Education of children in formal and non-formal settings, including persons with disabilities
- Sustainable management of resources and new product development
- Communication for development, participatory communications and innovative media development

Lady Irwin College offers following programs

Postgraduate Programmes

- B.Ed. – Two Year degree course
- B.Ed. Special Education (MR) – Two Year degree course
- Postgraduate Diploma in Dietetics and Public Health Nutrition – PGDDPHN (1 Year)
- M.Sc. – Four semester degree course in the following specializations
 - Food and Nutrition
 - Human Development and Childhood Studies
 - Fabric and Apparel Science
 - Development Communication and Extension
 - Resource Management and Design Application

Undergraduate Programmes

- B.Sc. Home Science (3 Years)
- B.Sc. (Hons) Home Science (3 Years)
- B.Sc. (Hons) Food Technology (3 Years)
- NEP Cluster SEC,VAC and AEC Sem. I(Nov.2022-Feb. 2023)

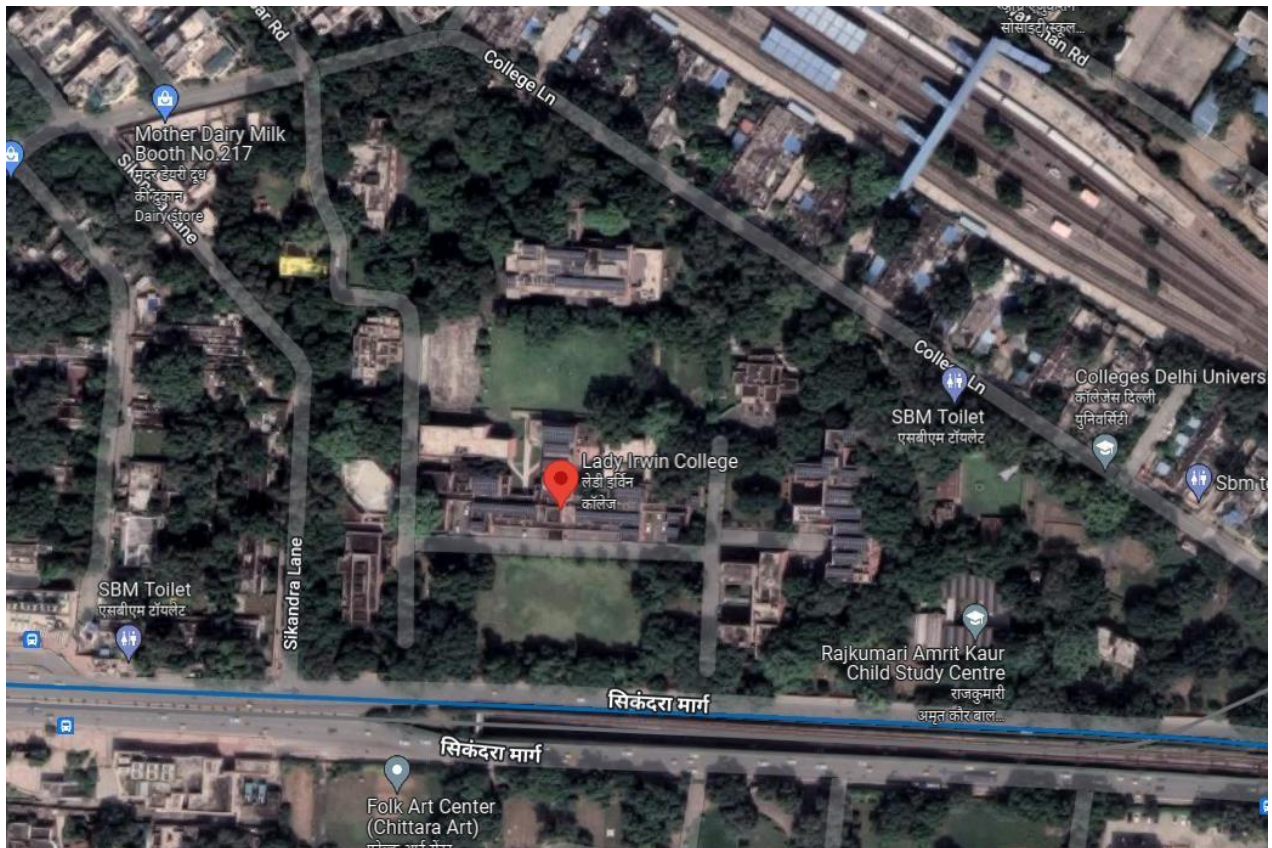
Ph. D. All 5 specializations

Short-term Certificate Courses

- Rhinoceros Course
- Retail Management Course
- CSR course
- Auto CAD Course



Map location of campus





AUDIT PARTICIPANTS

On behalf of Lady Irwin College, New Delhi

| Name | Designation/Department |
|-----------------------|---|
| Prof. Anupa Siddhu | Director, Lady Irwin College |
| Prof. Sushma Goel | Vice Principal |
| Prof. Puja Gupta | Convener, Environment Audit & NAAC CR-VII |
| Prof. Meenakshi Mital | Convener, Environment Audit & NAAC CR-VII |
| Dr. Meenal Jain | Convener, Environment Audit & Member, NAAC CR-VII |
| Ms. Vishakha Sambhav | Member, NAAC CR-VII |
| Ms. Shefali Chopra | Member, NAAC CR-VII |
| Ms. Mitali Yadav | Member, NAAC CR-VII |
| Ms. Geetika Mishra | Ph.D. Scholar |

On behalf of EHS Alliance Services

| Name | Position | Qualifications |
|------------------|--------------|---|
| Dr. Uday Pratap | Lead-Auditor | Ph.D. , PDIS, Lead Auditor ISO 14001:2015, QCI – WASH, Field expert |
| Mr. Vivek Bajpai | Co-Auditor | M.Sc. in Environment Sciences, Field Expert, Post Diploma in Industrial Safety Management |



EXECUTIVE SUMMARY

This report is an attempt to provide an overview of water distribution and consumption, its variation and reduction potential for Lady Irwin College, located in Delhi. The report also highlights the major water saving opportunities available at college premises. A set of recommendations which will assist in improving water efficiency has also been highlighted in this report. This report has emerged after a water audit of Lady Irwin College on dated 25/11/2022. The water conservation opportunities are discussed in detail.

ASSESSMENT OF PRESENT WATER USAGE

1.1 WATER CONSUMPTION TRENDS

The major source of water to the plant is through NDMC Canal Water. The separate intake pipe lines are laid for grey water & drinking water in school premises. Grey water is used for gardening purpose where as fresh water is used for all other application. To make the water suitable for use, the water is treated as per drinking requirement.

The average daily water consumption at all the consumption areas

Water consumptions based on different categories of usage

Basic use of water in campus:

Drinking – 47.31 KL/month

Gardening – 1959.53 KL/month

Kitchen and Toilets – 310.68 KL/month

Others – 113.02 KL/month

Hostel – 429.20 KL/Month

Total = 2859.73 KL/Month

Water storage Details

Lady Irwin College relies on DJB for water as a primary source and has bore well as a secondary source. Total water storage is 110600 liters within the College campus.



| Location Name | water Tank Size (Liters) | Count of Tanks | Total Storage |
|---------------|--------------------------|----------------|---------------|
| Library | 500 | 4 | 2000 |
| Library | 1000 | 1 | 1000 |
| House Block | 1000 | 3 | 3000 |
| House Block | 12000 | 1 | 12000 |
| F/T Block | 1000 | 1 | 1000 |
| F/T Block | 2000 | 1 | 2000 |

| | | | |
|---------------------------|-------|----|---------------|
| F/T Block | 12000 | 1 | 12000 |
| Admin Block | 300 | 1 | 300 |
| Admin Block | 500 | 1 | 500 |
| Admin Block | 1000 | 10 | 10000 |
| Textile Block (Old B.Ed.) | 300 | 1 | 300 |
| Textile Block (Old B.Ed.) | 500 | 1 | 500 |
| Textile Block (Old B.Ed.) | 1000 | 5 | 5000 |
| Textile Block (Old B.Ed.) | 2000 | 1 | 2000 |
| PG Block | 500 | 2 | 1000 |
| PG Block | 1000 | 1 | 1000 |
| PG Block | 2000 | 3 | 6000 |
| DHCS Nusrey | 300 | 1 | 300 |
| DHCS Nusrey | 500 | 3 | 1500 |
| DHCS Nusrey | 10000 | 1 | 10000 |
| Staff Office | 300 | 7 | 2100 |
| Staff Office | 1000 | 1 | 1000 |
| Student Center | 1000 | 1 | 1000 |
| Student Center | 2000 | 1 | 2000 |
| Director residence | 500 | 1 | 500 |
| Director residence | 1000 | 3 | 3000 |
| Staff Office | 500 | 20 | 10000 |
| Staff Office | 15000 | 1 | 15000 |
| Others | 1000 | 4 | 4000 |
| Main gate | 300 | 2 | 600 |
| Grand Total | | | 110600 |



Saving Techniques

- Avoid overflow of water controlled valves are provided in water supply system.
- Close supervision for water supply system.
- Water Conservation awareness for new students
- Sprinklers usage for gardening and grass cover
- Lady Irwin College ensures that the faucets in the washrooms and water filtration units are checked regularly and do not have any leakages.
- Lady Irwin College has also initiated the installation of auto push taps to reduce water wastage.

Point of entry of water and point of exit of waste water in the institute.

Entry – Lady Irwin College uses DJB water and have borewells as a secondary source of water

Exit – From Canteen, Toilets, bathrooms, laboratories and Hostels through covered drainage which is connected to sewage

Ways that could reduce the amount of water used in the institute

Basic ways:

- Close the taps after usage
- Maintenance and monitoring of valves in supply system to avoid overflow, leakage and spillage
- The Lady Irwin College ensures that the faucets in the washrooms and water filtration units are checked regularly and do not have any leakages.
- The Lady Irwin College has initiated the installation of auto push taps to reduce water wastage.



WATER CONSERVATION OPPORTUNITIES

1. STRENGTHENING OF WATER DISTRIBUTION & USAGE POINTS

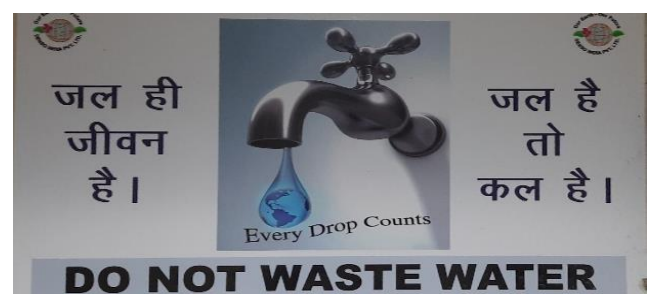
Observation: During visit, Staff are not very much aware about the per day fresh water consumption & water meters are installed only intake not on consumption points. The whole college may be divided in zones & separate water consumption meters to be installed for each building & there should be daily monitoring of consumption for each zone/building. The College should monitor every storage & consumption points so that there is no loss in the distribution & usage points.

Recommendations: It is suggested to take water as main focus area that should be insured optimum utilization. There should be yearly targets to reduce the water consumption on each zone.

Implementation of the above recommendation would result in reduction in fresh water consumption.

2. AWARENESS AND TRAINING ON WATER CONSERVATION

The College has total headcount of about 1636 people (Students ~ 1419 & Teaching staff ~ 104 & Non teaching staff ~ 113) and around 31.5% of total freshwater consumption is for domestic consumption by student & staff and in residential colonies. The College staff & student at all levels should be made aware and trained on 'Water Saving & Conservation'. The college should place water saving labels/posters in the college at noticeable locations like near handwashing taps; washrooms, reception office etc. to create awareness & sense of responsibility among staff/students/visitors. Some examples of water conservation posters which may be placed are shown below for reference.

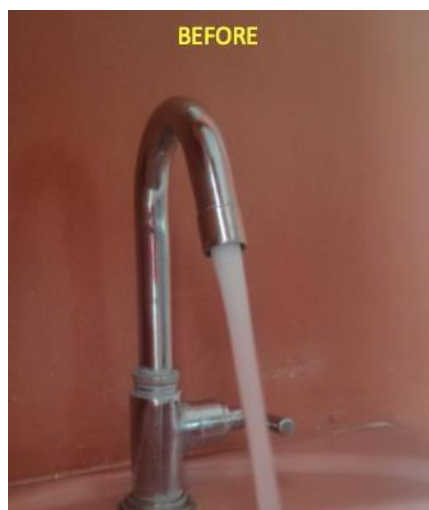


3. INSTALLATION OF FLOW RESTRICTORS OR REPLACEMENT OF INEFFICIENT TAPS

Observation: During the audit, tap flow survey was conducted at various locations of the college. The average tap flows was around 10 lpm (litres per minute) with high flows upto 16 lpm. It is estimated that about 30 m³/day is being consumed in handwashing (considering at least 2 minutes of handwash i.e. 14 litres per person per day).

The college should installed water efficient faucets at canteen and Hostel. The flow of these taps is < 2 lpm leading to water savings of more than 80% by these taps.

Recommendations: It is recommended to install the flow restrictors / faucets at all the hand washing taps. Faucets and fixtures are available in the market now a days to reduce water consumptions in wash basins by reducing flow without compromising comfort level of user. This will result in savings of more than 70 percent with faucets water use. Flow regulators, especially the aerators are inexpensive and are easy to install and maintain. The images of such faucets are shown below.



4. GREY WATER & DUAL FLUSH CISTERNS FOR FLUSHING IN TOILETS

Observation: During the audit, the usage of freshwater for flushing in toilets in the college premises was observed. . It was observed that both single and dual flushing systems (however less in number) were installed in the toilets.

Recommendations: It is suggested that grey water to be used in toilet flushing instead of using filtered water. It is estimated this will save about 100 m³/day of fresh water presently used in the toilets. The investment would involve capex investment with separate pumping & piping installation and storage tank. It is also suggested to explore the possibility of replacing the grey water for flushing in School complex and other colonies.

5. NO FRESH WATER FOR CLEANING / GARDENING

Observation: During the audit, it was observed that stored water from the rainwater harvesting tanks was being used for floor cleaning purposes and non-potable water was being used for gardening..



Recommendations: It is recommended to have more such water tanks for non-potable uses.

6. MINIMIZING VISIBLE WATER LEAKAGES (FROM VARIOUS WATER PIPES, WATER PUMPS ETC.)

Observation: At some locations, leakages were observed from the piping system and gland seal set. All the leakages when combined constitutes to a considerable amount of costly water leaking from the system.



Recommendations: The hidden water leaks can cause loss of considerable water and energy without anyone being aware of it. A small leak can amount to large volumes of water loss. Leaks become larger with time, and they can lead to other equipment failure. The establishment of a leak detection and repair program would be a most cost-effective way to save money and water in the Plant premises. Records of the type, location, number, and repair of leaks should be kept in a central location.

It is recommended to arrest the leakages in the system and continuously monitor the condition of the piping system to save fresh water.



REFERENCES:

- The Environment [Protection] Act – 1986 (Amended 1991) & Rules-1986 (Amended 2010)
- The Petroleum Act: 1934 – The Petroleum Rules: 2002
- The Central Motor Vehicle Act: 1988 (Amended 2011) and The Central Motor Vehicle Rules:1989 (Amended in 2005)
- Energy Conservation Act 2010.
- The Water [Prevention & Control Of Pollution] Act – 1974 (Amended 1988) & the Water (Prevention & Control of Pollution) Rules – 1975
- The Air [Prevention & Control Of Pollution] Act – 1981 (Amended 1987) The Air (Prevention & Control of Pollution) Rules – 1982
- The Gas Cylinders Rules – 2016 (Replaces the Gas Cylinder Rules – 1981
- E-waste management rules 2016
- Electrical Act 2003 (Amended 2001) / Rules 1956 (Amended 2006)
- The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules, 2008 (Amended 2016)
- The Noise Pollution Regulation & Control rules, 2000 (Amended 2010)
- The Batteries (Management and Handling) rules, 2001 (Amended 2010)
- Relevant Indian Standard Code practices

Transparency of Water Audit Report

Water audit report is one of the useful means of demonstrating an organization's commitment to openness and transparency. If an Organisation believes it has nothing to hide from its stakeholders, then it should feel confident enough to make its water audit reports freely available to those who request them. As a basic rule, water audit reports should be made available to all stakeholders.

***** **END OF THE REPORT** *****