

SUSTAINABLE LIVING INC

Certificate of Completion

This is to certify that

Anurag Engineering College

has successfully completed

Environmental Audit (Water and Waste
Management)

The study was completed by Sustainable Living Inc

Hiran Prashanth

Hiran Prashanth
Environmental Sustainability Auditor
Sustainable Living

Issued by Sustainable Living Inc

August 2020


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(Autonomous)
Ananthagiri (V&M), Suryapet Dist. T.S.

Sustainable Living Inc



Anurag

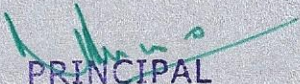
ENGINEERING COLLEGE

(An Autonomous Institution)

**Environmental Audit (Water
and Waste Management)**

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Acknowledgment

Sustainable Living Inc

Hiran Prashanth
Environmental Sustainability Auditor

30 Aug 2020

Environmental Audit (Water and Waste Management)

The Sustainable Living Inc acknowledges with thanks the cooperation extended to our team for completing the study at Anurag Engineering College (AEC).

We are sure that the recommendations presented in this report will be implemented and the AEC team will further improve their environmental performance

Kind regards,

Yours sincerely,

Hiran Prashanth

Hiran Prashanth
Environmental Sustainability Auditor
Sustainable Living In



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Executive Summary

As an Institution of higher learning, AEC firmly believes that there is an urgent need to address the environmental challenges and improve their environmental footprint.

True to its belief, AEC has implemented rainwater harvesting in the campus. Continuing with rainwater harvesting, the college can also investigate the following recommendations:

- **Install water efficient fixtures:** The best way to conserve water is at the source. Therefore, AEC will have to install water efficient fixtures to reduce water consumption. Some of the water efficient fixtures are:
 - Waterless urinals
 - Electronic taps (e-taps)
 - Electronic flush urinals (e-flush)
 - Foam taps
 - Spring loaded push taps
 - Low flush cistern
- **Install water flow meters:** Water flow meters are vital in understating the water consumption patterns of the campus. Presently, the water consumption is calculated rather than being measured. Water flow meters gives an accurate status if water consumption in the campus and from the water consumption values, the roadmap for water conservation activities can be prepared.
- **Segregate waste at source:** AEC has provided bins for waste collection. The effectiveness of the system is still not up to standards. Therefore, AEC must embark on awareness creation methods to increase the effectiveness of collection and provide more bins for proper waste segregation.


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Environmental Audit

AEC and Sustainable Living Inc are working together to identify opportunities for improvement in water management, and waste management. This report highlights all the potential proposals for improvement through the audit and analysis of the data provided by AEC for water consumption and waste management. The report details the process conducted for the analysis such as on ground surveys performed for listing the type of water consumers with consumption per year, types of waste generated and disposal mechanisms.

Submission of Documents

Environmental audit at AEC was carried out with the help data submitted by AEC team. AEC team was responsible for collecting all the necessary data and submitting the relevant documents to Sustainable Living Inc for the study.

Environmental Audit

Data submitted and collected during the visit was used to assess the water and waste management practices of the campus and finally provide necessary recommendation for environmental improvement.

Water Conservation

To achieve a water positive status by continuous reduction of freshwater consumption should be the ultimate focus of AEC. Increased and focused attention should be given to attain water sustainability in future by inculcating the discipline of water conservation.

Fresh water consumption of AEC : 20 KL per day (KLD) (Calculated)

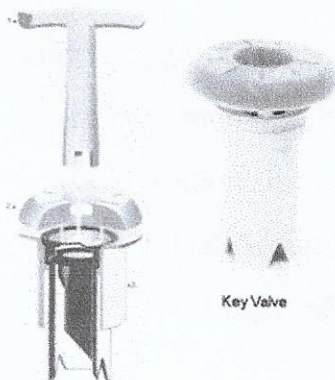
According to the report, 'Water in India: Situation & Prospects', India is the largest consumer of groundwater in the world with an estimated usage of 230 km³ per year. Approximately 60 per cent of the demand from agriculture and irrigation, and about 80 per cent of the domestic water demand, is met through groundwater. As per the Department of Drinking Water and Sanitation nearly 90 per cent of the rural water supply is from groundwater sources. This has led to an increased pressure on aquifers and the resulting hydrological imbalance.

Recommendations for water conservation:

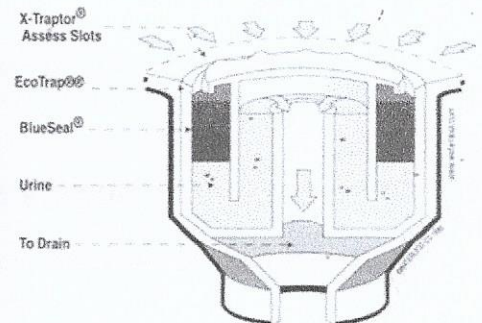
1) **Waterless urinals:** Waterless urinals look like regular urinals without a pipe for water intake. Men use them normally, but the urinals don't flush. Instead, they drain by gravity. Their outflow pipes connect to a building's conventional plumbing system. In other words, unlike a composting toilet, which leaves you to deal with your waste, these urinals send the urine to a water treatment plant.

- a. Urine flows into the drain insert of the EcoTrap.
- b. Inside of the EcoTrap the urine moves through a floating layer of proprietary immiscible BlueSeal liquid, which creates a barrier, preventing sewer gases and urine odors from entering the restroom area.
- c. The urine below the BlueSeal barrier overflows into the central tube and travels down into the drain line.

Waterless Urinal



Waterless Urinal



CII

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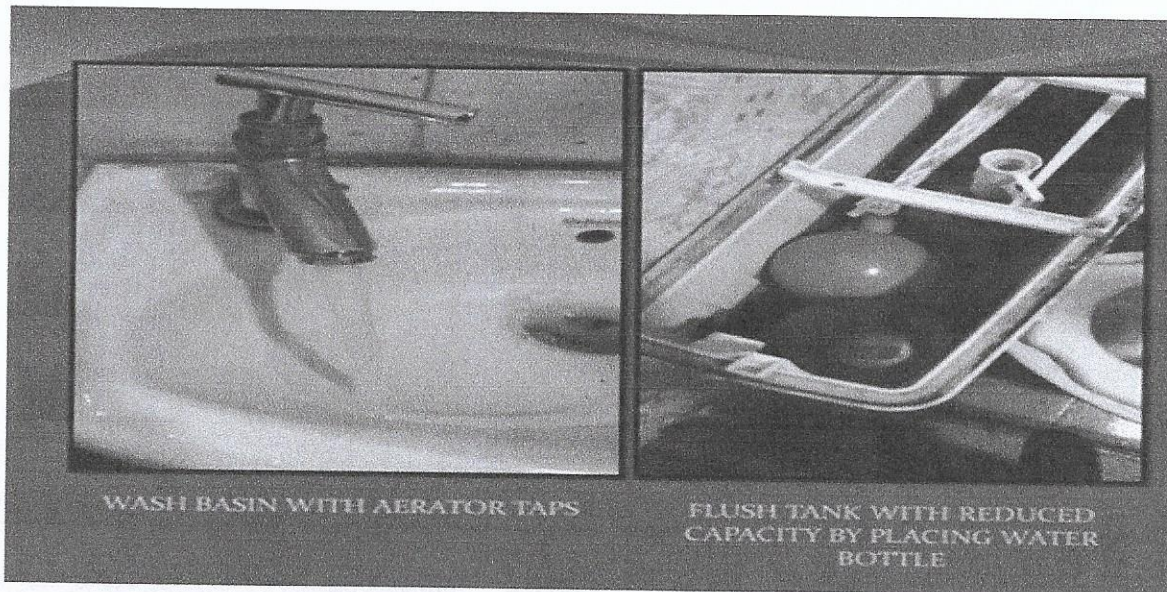
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- d. Approximately 1500 sanitary uses are possible with just 3 ounces of BlueSeal. When the BlueSeal liquid is gone, it is simply replenished. This only takes about 20 seconds to perform and the EcoTrap is not touched.
- e. Urine sediments are retained within the EcoTrap. Replacement is easy and need only be done 2 to 4 times per year depending on traffic to the urinal. As tool called the X-Traptor must be used to remove the EcoTrap. The use of the special tool helps to minimize vandalism. The entire process of replacement only takes 3 to 4 minutes.


2) Volume reduction in flush tanks: One simple method is to add a one-liter equivalent water bottle in the flush tank thereby reducing its consumption majorly. One-liter savings in the tank will help to save approximately by 20% and doesn't require any investment.



3) Rainwater harvesting: Water harvesting or more precisely rainwater harvesting is the technique of collection and storage of rainwater at surface or in subsurface aquifer, before it is lost as surface run off. In artificial recharge, the ground water reservoirs are recharged at a rate higher than natural conditions of replenishment.

According to a report by the Central Groundwater Board published in 2007, the selection of a suitable technique for artificial recharge of ground water depends on various factors. They include:

- a) Quantum of non-committed surface runoff available
- b) Rainfall pattern
- c) Land use and vegetation
- c) Topography and terrain profile
- d) Soil type and soil depth
- e) Thickness of weathered / granular zones
- f) Hydrological and hydrogeological characteristics

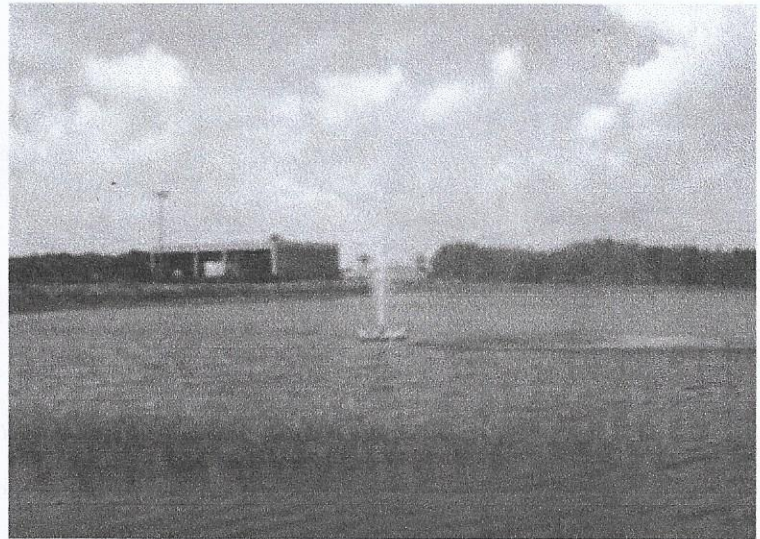

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Socio-economic conditions and infrastructural facilities available

h) Environmental and ecological impacts of artificial recharge scheme proposed

Rainwater Harvesting Techniques in Urban Area

In urban areas rainwater is available from roof tops of buildings, paved and unpaved areas. This water could be stored and used to replace freshwater as well as used for recharging the aquifer.



Water Saving Gadgets

It is suggested to display specific water consumption numbers in terms of domestic use at the entrance of each blocks to create awareness among all students and stakeholders visiting the facility. This

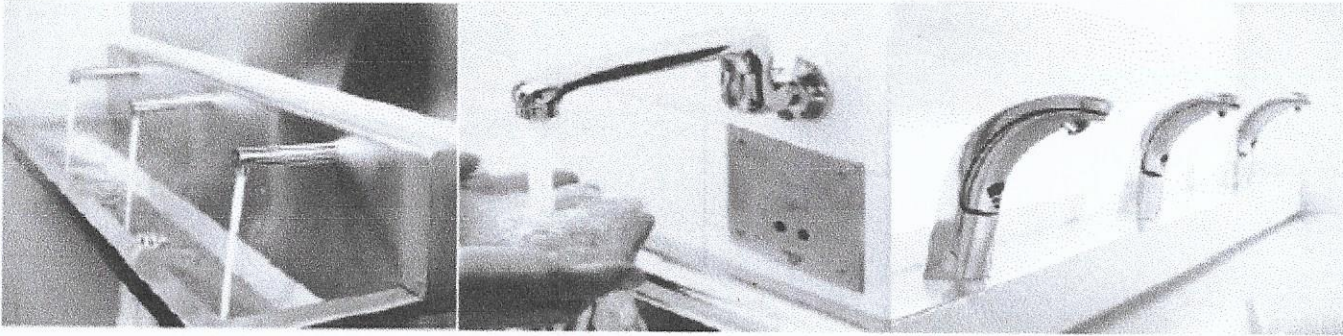
Electronic Taps (e-taps)

The latest trend in industries is to install electronic taps (e-taps). The advantages of using e-taps are as mentioned below:

- Unlike conventional taps, there is no twisting or turning in e-taps. They have a sensor, which cuts off water supply completely when not in use. This helps in saving up to 70% water during hand wash.
- E-taps enable hands free operation. No fear of cross contamination or contact with germs. E taps score very high on hygiene. It is the most ideal choice for multipurpose and multi-user

washrooms.

- E-taps can work efficiently up to raw water TDS of 1,800 ppm.
- The touch free electronic taps, available in AC and DC models consume minimal power only. The AC model has an efficient battery back-up, while the DC model runs on just 4 alkaline batteries.



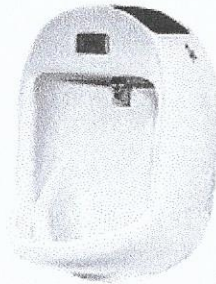
Operation of Electronic Taps

This has been successfully implemented in several hotels & restaurants. Of late, several industries have also started implementing this proposal. Thus, there is a good potential to optimize the freshwater consumption by replacing the existing taps with e-taps.

Electronic flush (e-flush) urinals

The latest trend in industries is to install e-flush urinals. The advantages of using e-flush urinals are as mentioned below:

- E-flush urinals are fitted with a sensor, which senses the usage and flush with water for few seconds after use. This helps in saving 70% water during urinal flush.
- E-flush urinals enable hands-free operation and score very high on hygiene. It is the most ideal choice for multipurpose and multi-user washrooms.
- E-flush urinals can work efficiently up to raw water TDS of 1,800 ppm.
- The touch free e-flush urinals available in AC and DC models consume minimal power only. The AC model has an efficient battery back-up, while the DC model runs on just 4 alkaline batteries.

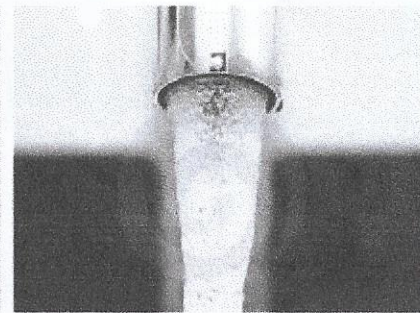
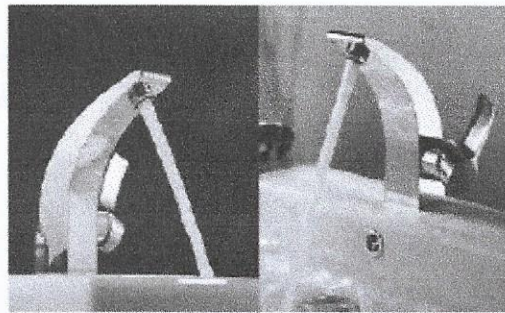
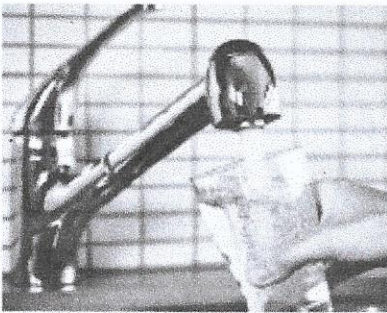


Photographs: Electronic flush urinals

Hand wash

Foam taps

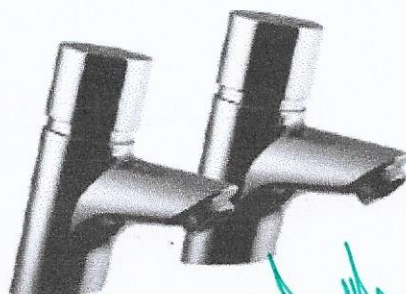
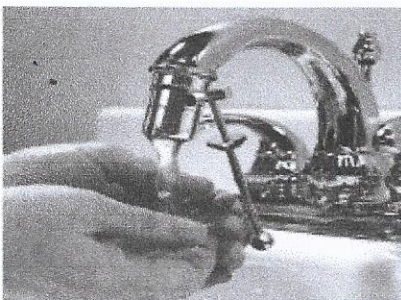
Conventional taps are used in the hand wash areas which results in wastage of large quantities of flush water. Foam taps are a better fit in these high consumption areas. They consume 25-30% less water than conventional taps.



Photographs: Foam taps

Spring loaded Push taps

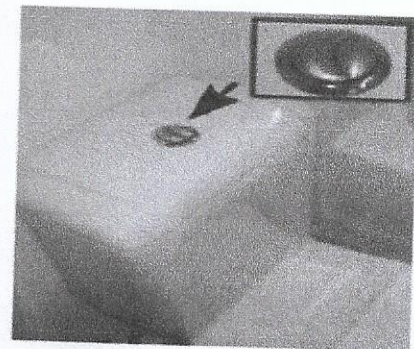
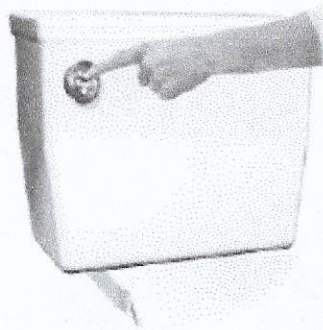
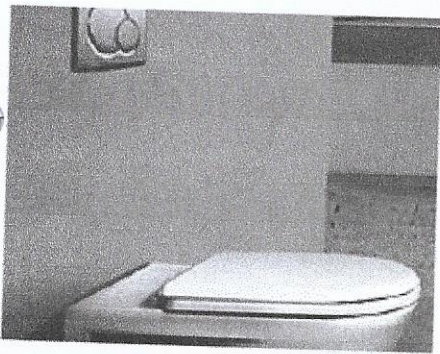
Spring loaded push type tap is an alternate device for minimizing hand wash water. The spring-loaded push taps operate with the simple mechanism of pressing the knob for water. The knob is automatically released back to close position in 5-7 seconds. This saves about 30-40% of water compared to the conventional taps.




Photographs: Spring loaded push taps

Low flush cistern

The latest model closets are water efficient and operate in dual mode, with a single flush releasing 2 litres of water and the dual flush releasing 4 litres per flush. This results in excellent water savings.



Photographs: Low flush cisterns


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Install water flow meter:

Water flow meters are vital in understating the water consumption patterns of the campus. Presently, the water consumption is calculated rather than being measured. Water flow meters gives an accurate status if water consumption in the campus and from the water consumption values, the roadmap for water conservation activities can be prepared.



Water Meters would have many advantages:

- Encourage water conservation – important given strain on water resources
- Encourage allocatively efficient distribution. People would consume to where the marginal cost = marginal utility
- In long term lower overall water consumption would reduce leading to even lower water bills.


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Waste Management

India has drawn world's attention with its high paced urbanization and industrialization. Over the last decade, India has emerged as the fastest growing country with rapid economic growth. A renewed focus on sustainable growth and development is imperative as India strives to maintain its high GDP growth rate in its pursuit of achieving developed country status by the year 2022. However, the flip side of higher economic growth has resulted in increased consumption of the natural resources, increased waste generation and hence ecological degradation.

Present status: AEC has initiated waste management activities inside its facility. Separate bins have been provided for different types of wastes. Waste bins are provided throughout the campus and students are being urged to use the bins effectively.

Observation: Though the collection of waste is being done in an orderly fashion, the storage of waste needs an improvement. Presently, the wastes are segregated at the source. The collected wastes are then taken to waste storage yard. The storage of wastes in the waste storage yard needs to be improved upon.

Recommendation: The waste management yard must be maintained in a similar fashion as that of a raw material storage room. Therefore, a total revamp of the waste storage yard is to be carried out. By doing so, the quality of the materials stored in the yard will not deteriorate and can be used a raw material for a subsequent process.



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Conclusion

Environmental sustainability is a continuous process and there is always a scope for improvement. AEC has displayed itself as an advocate of environmental sustainability by getting environmental audit carried out. The organization has implemented several initiatives and measures to enhance efficiency and to optimize resource intensity. The journey ahead in the path towards environmental excellence has immense scope for improvement as brought out by this report.

AEC needs to focus and work on areas efficiency levels needs to be enhanced. For example: waste management. The observations and suggestions put forth by the report would help the facility in improving its environmental performance and pave way for ecologically sustainable growth.

This report may be taken as a guide and roadmap for achieving higher performance rating in environmental stewardship. As one of the pioneers and leaders AEC shoulder the task of further 'learning – teaching – learning' to improve, excel, and continue the innovative efforts for success of their students and associates.


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