Samarth Consultants

GREEN AUDIT REPORT

K.R. MANGALAM UNIVERSITY

Address – Sohna Road,
Gurgaon, Haryana 122103

For SAMARTH MANAGEMENT PRIVATE LIMITED
Authorized Signatory

Audit Conducted by:

SAMARTH CONSULTANTS
212, BHERA ENCLAVE, PASCHIM VIHAR, DELHI – 110087
Audit Date – 06th March, 2019

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

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CERTIFICATE OF EXCELLENCE

THIS IS CERTIFY THAT **K. R. MANGALAM UNIVERSITY** HAS SUCCESSFULLY

COMPLETED THE **GREEN** AUDIT PROGRAM

CONDUCTED ON **06 MARCH 2019**

For SAMARTH MANAGEMENT PRIVATE LIMITED
Samarth Suri
Authorized Signatory

CERTIFICATE NO. **SMPL/2019/C-0015** DATE OF ISSUE **15-03-2019** AUTHORISED SIGNATORY

CONDUCTED BY

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ABOUT KRMU

K.R. Mangalam University is the fastest-growing higher education university in Gurgaon, India. Since its inception in 2013, the University has been striving to fulfil its prime objective of transforming young lives through ground-breaking pedagogy, global collaborations, and world-class infrastructure.

As we have stepped into the innovative world, we have gained exposure to unlimited learning and employment opportunities beyond social and geographical boundaries. K.R. Mangalam University, being a progressive learning platform, is a host to knowledge-seekers from across the globe.

K.R. Mangalam University aspires to become an internationally recognized institution of higher learning through excellence in interdisciplinary education, research, and innovation. Its goal is to prepare socially responsible, lifelong learners who will contribute to nation-building.

- Foster employability and entrepreneurship through a futuristic curriculum and progressive pedagogy with cutting-edge technology.
- Instill the notion of lifelong learning through stimulating research, Outcomes-Based education and innovative thinking.
- Integrate global needs and expectations through collaborative programs with premier universities, research centres, industries and professional bodies.
- Enhance leadership qualities among the youth, understanding ethical values and environmental realities.

K.R. Mangalam University education strongly emphasizes foundational knowledge, thorough academic research based on rigorous pedagogy and hands-on experience with real-world challenges. The synthesizing nature of the curriculum allows the student to learn by making connections between ideas and concepts across different disciplinary boundaries. The interdisciplinary structure at K.R. Mangalam University is designed to enable the integration of ideas & characteristics from across disciplines. At the same time, it addresses students' differences and helps develop critical, transferable skills. K.R. Mangalam University, owned by K.R. Mangalam Group, aims to provide world-class education in the higher educational services sector for undergraduate, postgraduate, and doctoral programmes.

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ABOUT SAMARTH CONSULTANTS

M/s SAMARTH CONSULTANTS is a management and environmental consulting organisation that has worked in the environmental field since 2004. The organisation has a team of environmental experts with vast knowledge. SMPL provides services for various sectors, such as

- Preparing Environment Impact Assessment (for Building & Construction Projects, Small and big manufacturing units, Hospitals, Educational Institutions, Hotels etc.)
- Samarth Consultants has prepared Green Audit reports for various universities and organizations.
- The team involved in this auditing and report preparation is given below:

	Name	Designation
1.	**Mrs. Seema Suri**	**Auditor**
2.	**Mr. Sanjeev Singh**	**Auditor**

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1. INTRODUCTION

The green audit aims to analyze environmental practices within and outside the university campuses, which will impact the eco-friendly atmosphere. Green audit can be defined as the systematic identification, quantification, recording, reporting and analysis of components of the university environment. It was initiated to inspect the efforts within the institutions whose exercises can cause a threat to the health of inhabitants and the environment. Through the green audit, a direction for improving the structure of the environment is established.

1.1. NEED FOR GREEN AUDITING

Green auditing identifies and determines whether institutions' practices are eco-friendly and sustainable. Traditionally, we are excellent and efficient users of natural resources. However, over time, excess use of resources like energy and water has become a habit in common areas. It is necessary to check whether our processes consume more than the required resources. Are we handling natural resources carefully? Green audits regulate all such practices and provide an efficient way of utilising natural resources. In the era of climate change and resource depletion, it is necessary to verify the processes and convert them into a green and clean one. Green audit provides an approach for it. It also increases overall consciousness among the people working in institutions towards a sustainable environment.

1.2. GOALS OF GREEN AUDIT

The university has conducted a green audit with specific goals:

I. Identification and documentation of green practices followed by the University.
II. Identification of strengths and weaknesses of the University in green practices.
III. Analyze and suggest solutions for problems identified.
IV. Assess the facility for different types of waste management.
V. Increase environmental awareness throughout campus.

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VI. Identify and assess environmental risk.

VII. Motivates staff for optimised, sustainable use of available resources.

VIII. The long-term goal of the environmental audit program is to collect baseline data on environmental parameters and resolve environmental issues before they become a problem.

1.3. OBJECTIVES OF GREEN AUDIT

I. To examine the current practices that can impact the environment, such as resource utilisation, waste management, etc.

II. To identify and analyse significant environmental issues.

III. Set up a goal, vision, and mission for green practices on campus.

IV. Establish and implement environmental management in various departments.

V. Continuous assessment for betterment in performance in green

1.4. BENEFITS OF GREEN AUDIT TO EDUCATIONAL INSTITUTIONS

There are many advantages of green audit to an Educational University:

IX. It would help to protect the environment in and around the campus.

X. Recognize cost-saving methods through waste minimization and energy conservation.

XI. Empower the organization to frame a better environmental performance.

XII. It portrays a good image of the institution through its clean and green campus.

2. OBJECTIVES AND SCOPE

The broad aims/benefits of the eco-auditing system would be:

- Environmental education through a systematic environmental management approach
- Benchmarking for environmental protection initiatives
- Sustainable use of natural resources on the campus.
- Financial savings through a reduction in resource use
- Development of ownership, personal and social responsibility for the University campus and its environment
- Developing an environmental ethic and value systems in the students of the University

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3. EXECUTIVE SUMMARY

A green audit is a snapshot of assessing campus performance in complying with applicable environmental laws and regulations. Though a helpful benchmark, the audit almost immediately becomes outdated unless there is some mechanism in place to continue the effort of monitoring ecological compliance. This audit report contains observations and recommendations for the improvement of environmental consciousness.

1. Energy use

As part of its focus on energy management, KRMU will strive to ensure:

- Inspection of the campus facilities every semester to identify, maintain and repair faulty or broken equipment on campus, such as ICT equipment, electrical devices, electrical panels, etc.
- Appropriate investment in developing renewable energy sources on campus, such as solar cell panels.
- Adoption of energy-efficient equipment/appliances and fixtures, such as LED and solar lights, on the campus.

2. Water Management

As part of its focus on water management, KRMU will strive to ensure:

- Inspection of the campus facilities every semester to identify and repair any faulty installations, such as pipes, taps, flushes, etc., that may lead to leaks and water waste.
- Adoption of rainwater harvesting techniques and proper utilization of the same
- The exploration of water recycling mechanisms through collaborations with appropriate organizations.

3. Waste Management

As part of its focus on waste management, KRMU will strive to ensure:

- Adoption of waste segregation methods such as appropriately placed dustbins for dry and wet waste.

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- Appropriate e-waste management practices for collection, disposal or recycling of such waste
- Minimal use of paper on the campus in all aspects of administrative and academic functioning by utilising ERP and emails to the extent possible
- Minimal use of plastic on campus to reduce non-recyclable waste
- Adoption of appropriate practices to reduce/recycle/treat municipal waste within the campus premises, such as collaborations with companies/NGOs for recycling
- Minimize hazardous waste and appropriate management of such waste

4. KRMU INFRASTRUCTURE

The KRMU campus is spread over 26.486 acres, with state-of-the-art infrastructure, modern settings, and cutting-edge apparatus that help students develop practical skills within the campus. All indoor venues are air-conditioned and have adequate lighting; ICT facilities, i.e. Wi-Fi, LAN, and LCD projectors, are divyangjan accessible.

4.1 DETAILS OF TREES AND PLANTS IN CAMPUS

Two-tier plantations have been done along the campus boundary. Fruit-bearing and shady plants like Ashok, Sondana, Kusum, Vismarkya, Kachnar, Pilkan, Sashut, Champa etc, are planted.

A nursery, a well-functioning greenhouse, a composting unit to provide organic manure, and trained manpower to carry out horticulture work are maintained. An organic orchard is created, which harbours a large number of horticulture plant varieties. Due to natural vegetation patches, the university is ecologically sound and is home to many birds and butterflies. Birds and Butterflies were documented inside the campus during a biodiversity survey.

4.2 WASTE MANAGEMENT

Management of the various types of Degradable and Non-Degradable waste at the campus Different types of waste are produce:

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- **Biodegradable Waste**
- **Non-biodegradable waste.**

Biodegradable materials are those that degrade or break down naturally. In other words, their decomposition happens with the help of natural agents like sunlight, microorganisms, water, ozone and more, which turns them into organic manure.

Non-biodegradable substances are materials that do not degrade quickly. These products are synthesized and do not occur naturally, so degradation is impossible.

Therefore, when they stay in the ecosystem for an extended period and do not decompose, they harm our environment.

The Institution adopts several measures to manage the various types of degradable and non-degradable waste at the campus.

Some of them are -

i. The Institution provides small dustbins in every classroom and faculty room and encourages students and faculty to throw their waste specifically in the dustbins.

ii. KRMU has ensured the installation of big dustbins near the Canteen/Cafeteria to promote the habit of disposing of waste in bins amongst students.

iii. The Institution also encourages using two different dustbins, a Green Dustbin and a Blue Dustbin. The same is done to segregate the waste.

iv. On each floor of the university, near the washrooms, big dustbins have been kept.

v. Incinerators are used for waste management.

4.3 USE OF DEGRADABLE WASTE

The food waste from the cafeteria and hostel mess is collected and used in the compost pit dug on the campus itself. This includes vegetable peels, leftover food, etc. This not only helps in proper waste management but also aids in the growth of other plants as the compost is later used as Organic Compost or Organic Natural Fertilizer.

4.4 RAINWATER HARVESTING

Conserving and preserving water is a key issue that the University has addressed in the form of Rainwater harvesting. The campus has been practicing rainwater mechanisms in a site area of 26 acres, approx. With 17 rainwater harvesting pits all over campus, this

(b) **STP**. An STP has been installed on campus that is capable of treating 100,000 Ltrs of water per 24 hours. The STP runs 12 hours per day per the contract, so on average, 50000 Ltrs of water are treated daily. The treated water is used for irrigation plants.

(c) **Oil**. There are four DG sets in university as a power backup during the failure of the main electrical supply. On average, per year, 215 Ltrs of waste oil is generated. The waste oil is contained in a leakproof container and sent to Head Office for further disposal-off.

4.7 DIESEL GENERATOR DETAILS

The KRMU has installed 3 Diesel Generators. The following table provides the university's Diesel Generator capacity.

S. No	Equipment Name	Make	Capacity in (kVA)
1	Diesel Generator - 01	Cummins	625 kVA
2	Diesel Generator - 02		380 kVA
3	Diesel Generator - 03		250 kVA

4.8 ALTERNATE SOURCES OF ENERGY AND ENERGY CONSERVATION MEASURES AT THE CAMPUS

The Institution has facilities for alternate sources of energy and energy conservation measures:

1. Solar energy
2. Use of LED bulbs/power-efficient equipment
3. Other measures

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1. Solar energy

K.R. Mangalam has taken the initiative to install solar lights in the garden and intends to increase solar light usage campus-wide. The University has a 310 KW solar power generating system on the rooftops of the academic buildings A, B, and C blocks, the DG room, and the hostel building. The solar system is wheeled to the grid.

Data for Solar Panels						
Sr. No	**Building**	**No. of Panels**	**Total no. of solar panels**	**Capacity**	**Total capacity**	**Rebate rate**
1	A	157	984	310 Kw/day	41850 units/month	0.25
2	B	375				
3	C	204				
4	DG	120				
5	Hostel	128				

2. Use of LED bulbs/power-efficient equipment

Power crisis is one of the most common problems in India. With the help of LEDs, we can eliminate this shortage by minimising the wastage of electrical power or saving our generated power. Light-emitting diodes (LED) are today's most energy-efficient and rapidly developing lighting technologies. Quality LED light bulbs last longer, are more durable, and offer comparable or better light quality than other types of lighting.

Energy Savings through the use of LEDs are a highly energy-efficient lighting technology that has the potential to change the future of lighting fundamentally.

LED bulbs were used for newly constructed buildings, and some incandescent and fluorescent tube lights were replaced with LED bulbs. The majority of the classrooms, laboratories, administrative blocks, computer centres, libraries, seminar halls, and staff rooms were provided with LED lighting systems that were supposed to be energy efficient. Now, the power consumption through lighting systems is about 20 per cent by LED bulbs.

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mechanism ensures an increase in the water table index. A certified architect has designed and implemented the rainwater harvesting system details throughout the campus. The average yearly rainfall data of Gurgaon is tabulated below:

Month	Avg. Temperature °C (°F)		Min. Temperature °C (°F)		Max. Temperature °C (°F)		Precipitation / Rainfall mm (in)		Humidity (%)	Rainy days (d)
January	13.5 °C	(56.4) °F	7.6 °C	(45.6) °F	20.1 °C	(68.2) °F	23	0	66%	2
February	17 °C	(62.6) °F	10.5 °C	(50.9) °F	23.8 °C	(74.8) °F	31	-1	59%	3
March	22.8 °C	(73) °F	15.3 °C	(59.6) °F	30.2 °C	(86.3) °F	20	0	45%	2
April	29.4 °C	(85) °F	21.2 °C	(70.1) °F	37 °C	(98.6) °F	13	0	27%	2
May	33.1 °C	(91.6) °F	25.6 °C	(78.1) °F	40 °C	(104) °F	19	0	30%	4
June	33.4 °C	(92.1) °F	28 °C	(82.4) °F	38.7 °C	(101.6) °F	71	-2	45%	7
July	30.2 °C	(86.4) °F	26.9 °C	(80.4) °F	34.1 °C	(93.4) °F	197	-7	69%	14
August	29 °C	(84.2) °F	26 °C	(78.8) °F	32.6 °C	(90.7) °F	180	-7	75%	15
September	28.2 °C	(82.7) °F	24.1 °C	(75.4) °F	32.7 °C	(90.9) °F	90	-3	69%	8
October	25.8 °C	(78.4) °F	19.3 °C	(66.8) °F	32.4 °C	(90.4) °F	14	0	52%	2
November	20.8 °C	(69.4) °F	14.3 °C	(57.7) °F	27.8 °C	(82) °F	5	0	52%	1
December	15.5 °C	(59.9) °F	9.2 °C	(48.6) °F	22.4 °C	(72.3) °F	7	0	60%	1

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Dimension of Rainwater Harvesting Pits and Desilting Pits as appended below: -

4.5 WATER HARVESTING PITS

- Depth - 3 Mtr
- Diameter – 3 Mtr
- Volume -3X3X670 (average rainfall in mm) X 0.8 =3216 Liters/pit X17 Nos pits Total=54672 Liters

Desilting Pits

- Depth - 03 Mtr
- Area - 3x3Mtr

4.6 SEWAGE TREATMENT PLANT

The University has a 100 KLD wastewater treatment plant, which treats the hostel's and all other blocks' wastewater. Liquid waste is 100% utilised within the campus. The treated water is stored in tanks and further used for gardens. Low-flush cisterns and sensor-based water tapes have been installed in washrooms to minimise water wastage.

The university has not maintained any record about waste management nor is any corroborated record held. The following type of waste is being generated on the university campus, and quantity is calculated based on average of certain items received and the waste material sold out to vendors during the last 02 years: -

Liquid

(a) **Water**. Potable water (an average of 75 Bottles per day) is being procured for the university. On average, 60,500 litres of water per day are used in the hostel. A water meter is not installed in the blocks, so actual water consumption cannot be ascertained; however, approximately 24,100 litres of water are consumed in all blocks.

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This initiative is very low-cost and also power-saving. It minimizes the university's electric bills. Moreover, it creates an opportunity to minimize load shedding on the campus.

3. Other Measures

- Energy-efficient electronic gadgets are used and maintained regularly to achieve energy conservation.
- Campaigns on energy conservation awareness are available in all relevant locations.
- Unwanted usage of power is discouraged in the University.
- The university has conducted various awareness drives on campus to ensure saving water & electricity.
- Star-rated refrigeration system
- Use of induction in pantry
- Awareness of how to conserve energy during the daytime.
- CNG Busses are used as a mode of conveyance for students and staff.

5. GREEN CAMPUS INITIATIVES/ACTIVITIES BY KRMU

KRMU, under its Green Campus Initiatives, has conducted activities in and around the campus. The list is attached herewith.

1	Van Mahotsav celebrations: NSS	24-Jul-2018
2	Lecture on Green Building & Green LEED Credential	19-Sep-2018
3	Best out of waste competition	26-Sep-2018
4	Awareness programme on E-waste	23-Oct-2018
5	Translating Green chemistry	20-Nov-2018

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6. SUMMARY

Green Audit is one of the essential tools to check the balance of natural resources and its judicial use. Green auditing is the process of identifying and determining whether institutional practices are eco-friendly and sustainable. It is a process of regular identification, quantification, documenting, reporting, and monitoring of environmentally important components in a specified area.

K.R. Mangalam University conducted a "Green Audit" from April 2018 to March 2019. The main objective of the audit is to check KRMU's green practices and conduct a well-defined audit report to understand whether KRMU is on the track of sustainable development.

7. CONCLUSION

From the green audit following are the conclusions, which can be taken for improvement in the campus.

1) All departments generate paper waste. Especially academic buildings. Using both sides of paper for printing and writing is good practice and using the other side of paper for rough work.
2) Food waste generated on campus is mostly collected from dining areas. The food waste is diverted to nearby farms.
3) E-Waste is segregated, handled, and disposed of properly in an eco-friendly manner.
4) Reducing the use of one-time-use plastic bottles, cups, folders, pens, bouquets, and decorative items will help, to some extent, solve the problem of plastic waste.

8. RECOMMENDATIONS

Following are some of the key recommendations for improving the campus environment:

i. Frequent visits should be conducted to ensure the generated waste is measured, monitored and recorded regularly, and information should be

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made available to the administration.

ii. The solid waste should be reused or recycled in the maximum number of possible places.

iii. Install a water meter to record usage on the campus premises.

iv. Proper use of color dustbins as per waste category.

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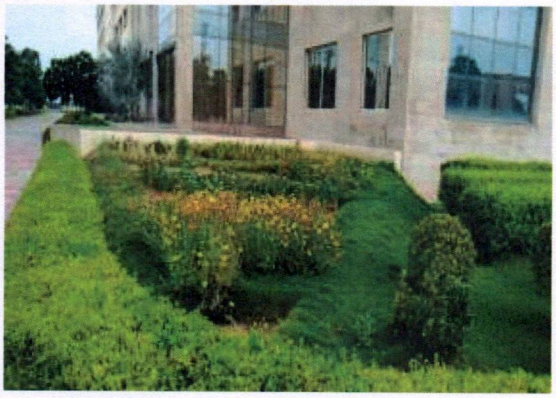
9. ANNEXURE-1 PHOTOGRAPHS

Greenery	CNG Buses
	
Plants in Campus	**STP**
	
Waste Management	**Solar Panel**
	

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