Criterion : VII – Institutional Values and Best Practices

Metric : 7.1.6 – Quality audits on environment and energy

Year : 2015 - 2020

Certificate from the auditing agency and Reports on environment and energy audits

7.1.6	***Quality audits on environment and energy are regularly undertaken by the institution (5)***	
	The institutional environment and energy initiatives are confirmed through the following	
QnM	1.Green audit	Yes
	2.Energy audit	Yes
	3.Environment audit	Yes
	4.Clean and green campus recognitions/awards	Yes
	5.Beyond the campus environmental promotional activities	Yes

1. Green Audit

List of Trees

Dr. D. STEPHEN
ASSISTANT PROFESSOR
DEPARTMENT OF BOTANY

THE AMERICAN COLLEGE
MADURAI 645002
Ph. 9944792299, 0452-2642289

TO WHOM IT MAY CONCERN

This is to certify that Fatima College (Autonomous), Madurai-18 has rich biodiversity of 69 species of trees comprises of 34 families and 65 genera, total of 1057 individual trees that includes few species which are Rare and Least Concern category of IUCN Red data list. The list of tree species in the Fatima College campus has been attached herewith.

Date: 20/05/2019

(Dr. D. Stephen)

Dr. D. STEPHEN, Ph.D.,
ASST. PROFESSOR IN BOTANY
THE AMERICAN COLLEGE
MADURAI - 625 002
TAMILNADU, INDIA

Criterion : VII – Institutional Values and Best Practices
Metric : 7.1.6 – Quality audits on environment and energy
Year : 2015 - 2020

LIST OF TREES RECORDED FROM FATIMA COLLEGE (AUTONOMOUS), MADURAI 625 018

S. NO	BOTANICAL NAME	FAMILY	COMMON NAME	NO OF INDIVIDUALS
1.	*Alangium salvifolium*	Alangiaceae	Sage Leaved Alangium	1
2.	*Mangifera indica*	Annonaceae	Mango	3
3.	*Polyalthia longifolia*		False Ashoka	26
4.	*Holarrhena antidysenterica*	Apocynaceae	Kurchi	1
5.	*CAlstonia scholaris*		Devil Tree	1
6.	*Borassus flabellifer*	Arecaceae	Palmyrah Palm	1
7.	*Caryota urens*		Fish Tail Palm	2
8.	*Phoenix pusilla*		Date Palm	1
9.	*Roystonea regia*		Royal Palm	14
10.	*Spathodea companulata*	Bignoniaceae	African Tulip Tree	1
11.	*Tabebuia impetiginosa*		Trumpet Tree	1
12.	*Crescentia cujete*		Calabash	1
13.	*Bombax ceiba*	Bombacaceae	Silk Cotton Tree	1
14.	*Cordia sebastina*	Boraginaceae	Geiger Tree	15
15.	*Cassia fistula*	Caesalpiniaceae	Golden Shower	13
16.	*Cassia javanica*		Javamese Cassia	4
17.	*Cassia siamea*		Iron wood	4
18.	*Delonix regia*		Gulmohar	24
19.	*Hardwickia binata*		Anjan	2
20.	*Peltophorum pterocarpum*		Copper Pod	110
21.	*Tamarindus indica*		Tamarind Tree	47
22.	*Bauhinia purpurea*		Orchid Tree	2
23.	*Bauhinia tomentosa*		Yellow Orchid Tree	6
24.	*Crateva religiosa*	Capparaceae	Mavalingam	2
25.	*Casuarina equisetifolia*	Casuarinaceae	Australian Pine	112
26.	*Terminalia catappa*	Combretaceae	Badam Tree	10
27.	*Terminalia crenulata*		KaruMaruthu	1
28.	*Terminalia bellerica*		Belleric myrobolan	1
29.	*Cycas revoluta*	Cycadaceae	Sago Palm	3
30.	*Shorea robusta*	Dipterocarpaceae	Sal	1
31.	*Emblica officinalis*	Euphorbiaceae	Indian Goose berry	2
32.	*Butea monosperma*	Fabaceae	Flame Of The Forest	2
33.	*Dalbergia sisoo*		Rose Wood	1
34.	*Pterocarpus santalinus*		Red Sander	1
35.	*Pungamia pinnata*		Pungamia	94
36.	Scaevola frutescens	Goodeniaceae	Badraksh	1
37.	*Gossypium arboreum*	Malvaceae	Tree cotton	2
38.	*Thespesia populnea*		Portia	1
39.	*Melia azedarach*	Meliaceae	Persian Lilac	1
40.	*Azadirachta indica*		Neem Tree	365
41.	*Coccus nucifera*	Arecaceae	Coconut Tree	8

42.	*Parkia biglandulosa*	Mimosaceae	Ball Badminton Tree	1
43.	*Prosopis cineraria*		Khejri	2
44.	*Samanea saman*		Rain Tree	20
45.	*Acacia catechu*		Khair	1
46.	*Adenathera pavonina*		Coral Tree	6
47.	*Albizia lebbeck*		Indian Siris	16
48.	*Ficus microcarpa*	Moraceae	Indian Laurel Ithi	1
49.	*Ficus religiosa*		Pipal	2
50.	*Artocarpus heterophyllus*		Jack fruit	1
51.	*Moringa oleifera*	Moringaceae	Drumstick	14
52.	*Psidium guajava*	Myrtaceae	Guava	1
53.	*Syzygium cumini*		Jamun	15
54.	*Bambusa vulgaris*	Poaceae	Bamboo	2
55.	*Ziziphus jujuba*	Rhamnaceae	Indian Jujube	2
56.	*Calystemone lanceolatus*	Rutaceae	Bottle Brush	2
57.	*Morinda tinctoria*	Rubiaceae	India Mulberry	40
58.	*Neolamarckia cadamba*		Kadambam	2
59.	*Ferronia elephantum*	Rutaceae	Wood Apple	1
60.	*Murraya koenigii*		Curry Leaves	4
61.	*Santalum album*	Santalaceae	Sandal Wood	1
62.	*Majedea zanguebarica*	Sapindaceae	Black Pearl Tree	1
63.	*Madhuca latifolia*	Sapotaceae	South Indian Mahua	7
64.	*Mimusops elengi*		Spanish Tree	8
65.	*Achras sapota*		Sapota	8
66.	*Ailanthus altissima*	Simaroubaceae	Tree of Heaven	1
67.	*Simarouba glauca*		Paradise Tree	8
68.	*Holoptelea integrifolia*	Ulmaceae	Indian elm	1
69.	*Tectona grandis*	Verbenaceae	Teak Wood	10

Dr. D. STEPHEN, Ph.D.,
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TAMILNADU, INDIA

Green Audit: List of Trees 2020

DR.D. STEPHEN
ASSISTANT PROFESSOR
DEPARTMENT OF BOTANY

THE AMERICAN COLLEGE
MADURAI 645002
Ph.9944792299, 0452-2642289

TO WHOM IT MAY CONCERN

This is to certify that Fatima College (Autonomous), Madurai- 18 has rich biodiversity of 88 species of trees comprising of 38 families 76 genera and a total of 1336 individual trees that includes few species that belongs to Near threatened, Vulnerable & Endangered category of IUCN Red data list. The list of tree species in the Fatima college campus has been attached herewith.

Date: 17.02.2020

(Dr. D.Stephen)

LIST OF TREES RECORDED FROM
FATIMA COLLEGE (AUTONOMOUS), MADURAI

S. NO	BOTANICAL NAME	COMMON NAME	NUMBER
1.	*Acacia catechu*	Khair	1
2.	*Achras sapota*	Sapota	8
3.	*Adenathera pavonina*	Coral Tree	6
4.	*Ailanthus altissima*	Tree of Heaven	1
5.	*Alangium salvifolium*	Sage Leaved Alangium	1
6.	*Albizia lebbeck*	Indian Siris	20
7.	*Alstonia scholaris*	Devil Tree	1
8.	*Artocarpus heterophyllus*	Jack fruit	1
9.	*Azadirachta indica*	Neem Tree	405
10.	*Bambusa vulgaris*	Bamboo	2
11.	*Bauhinia purpurea*	Orchid Tree	2
12.	*Bauhinia tomentosa*	Yellow Orchid Tree	6
13.	*Bombax ceiba*	Silk Cotton Tree	2
14.	*Borassus flabellifer*	Palmyrah Palm	1
15.	*Butea monosperma*	Flame Of The Forest	1
16.	*Calystemone lanceolatus*	Bottle Brush	2
17.	*Cassia fistula*	Golden Shower	40
18.	*Cassia javanica*	Javamese Cassia	4
19.	*Cassia siamea*	Iron wood	4
20.	*Casuarina equisetifolia*	Australian Pine	94
21.	*Coccus nucifera*	Coconut Tree	8

22.	*Cordia sebastina*	Geiger Tree	15
23.	*Crateva religiosa*	Mavalingam	2
24.	*Crescentia cujete*	Calabash	2
25.	*Cycas revoluta*	Sago Palm	6
26.	*Dalbergia sisoo*	Rose Wood	3
27.	*Delonix regia*	Gulmohar	50
28.	*Emblica officinalis*	Indian Gooseberry	2
29.	*Ferronia elephantum*	Wood Apple	1
30.	*Ficus microcarpa*	Indian Laurel Ithi	2
31.	*Ficus religiosa*	Pipal	2
32.	*Gossypium arboreum*	Tree cotton	8
33.	*Hardwickia binata*	Anjan	2
34.	*Holarrhena antidysenterica*	Kurchi	1
35.	*Holoptelea integrifolia*	Indian elm	1
36.	*Madhuca latifolia*	South Indian Mahua	10
37.	*Majedea zanguebarica*	Black Pearl Tree	1
38.	*Mangifera indica*	Mango	4
39.	*Melia azedarach*	Persian Lilac	1
40.	*Mimusops elengi*	Spanish Tree	10
41.	*Morinda tinctoria*	India Mulberry	60
42.	*Moringa oleifera*	Drumstick	14
43.	*Murraya koenigii*	Curry Leaves	4
44.	*Neolamarckia cadamba*	Kadambam	2
45.	*Parkia biglandulosa*	Ball Badminton Tree	1
46.	*Peltophorum pterocarpum*	Copper Pod	110

47.	*Phoenix pusilla*	Date Palm	1
48.	*Polyalthia longifolia*	False Ashoka	26
49.	*Prosopis cineraria*	Khejri	2
50.	*Psidium guajava*	Guava	1
51.	*Pterocarpus santalinus*	Red Sander	1
52.	*Pungamia pinnata*	Pungamia	185
53.	*Roystonea regia*	Royal Palm	14
54.	*Samanea saman*	Rain Tree	20
55.	*Santalum album*	Sandal Wood	1
56.	*Scaevola frutescens*	Badraksh	1
57.	*Shorea robusta*	Sal	1
58.	*Simarouba glauca*	Paradise Tree	8
59.	*Spathodea companulata*	African Tulip Tree	1
60.	*Syzygium cumini*	Jamun	15
61.	*Tabebuia impetiginosa*	Trumpet Tree	1
62.	*Tamarindus indica*	Tamarind Tree	47
63.	*Tectona grandis*	Teak Wood	20
64.	*Terminalia bellerica*	Belleric myrobolan	1
65.	*Terminalia catappa*	Badam Tree	10
66.	*Terminalia crenulata*	Karu Maruthu	1
67.	*Terminalia arjuna*	Ajuna	1
68.	*Thespesia populnea*	Portia	1
69.	*Ziziphus jujuba*	Indian Jujube	3
70.	*Phyllanthus acidus*	Star gooseberry	2
71.	*Cassia auriculiformis*	Ear leaf cassia	1

72.	*Calliandra emarginata*	Dwarf powder puff	2
73.	*Scaevola frutescens*	Beach cabbage	1
74.	*Saraca indica*	Ashoka tree	1
75.	*Lagerstroemia speciosa*	Crape myrtle	1
76.	*Michelia champaca*	champak	1
77.	*Gossypium arboreum*	Tree cotton	6
78.	*Khaya senegalensis*	Khaya	1
79.	*Pithacellobium dulce*	Manilla tamarind	1
80.	*Ficus benjamina*	Weeping fig	4
81.	*Aegle marmelos*	stone apple	1
82.	*Murraya exotica*	Orange jasmine	1
83.	*Cresentia cujete*	Kalabash tree	2
84.	*Jatropha curcas*	Physic nut	1
85.	*Jatropha multifida*	Coral plant	1
86.	*Lawsomia inermis*	Henna tree	2
87.	*Nerium oleander*	Oleander	20
88.	*Tecoma stans*	Yellow bell	1

(Dr. D.Stephen)

2. Energy Audit

ENERGY AUDIT REPORT

January 2020

For

FATIMA COLLEGE
Mary Land
Madurai-625018.

Audited by

Mr. C. Jebaraj B.Tech.
Certified Energy Auditor
TJ Solutions
4/101, Raja Sir Muthiah Nagar,
Bye-pass road, Ellis Nagar,
Madurai - 625 016.

ACKNOWLEDGEMENT

TJ Solutions, Madurai are thankful to Principal for giving us the opportunity to carry out Energy audit of M/s FATIMA COLLEGE, Mary Land, Madurai, Tamil Nadu 625018. Without whose keen interest, this audit would not have been possible.

TJ Solutions team are also thankful to all other supporting Officers / Staffs of above unit for their wholehearted support, hospitality and the courtesy extended to the Audit team during the course of the study.

The Following officers from TJ Solutions under the guidance of Mr. C. Jebaraj B. Tech Certified Energy Auditor have carried out the Energy Audit.

Name	Qualifications	Certification Number
Mr. C. Jebaraj B. Tech	Certificated Energy Auditor	EA-9847
Mr. A. Rajendran-BE	EEE	-
R. Manikandan	DEEE	-

C. JEBARAJ, B.Tech.,
Certified Energy Auditor
B.E.E. Reg. No: EA-9847
3, Madakulam Nadu Main Veethi
Ponmeni, Madurai-625 016
Mobile: 9994845487

TJ Solutions 21/01/2015 Madurai-10

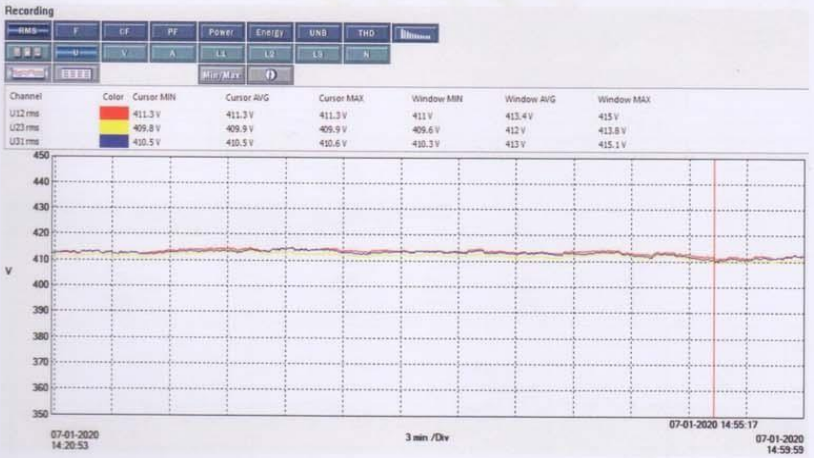
Table of content

I. MAIN PANEL (HT):

Date of Audit	07-01-2020	
TANGEDCO Service. NO	05-9094630106	
	Tariff	Permitted MD
	HT	300 KVA

1.1. Phase to Phase Voltage Readings:

RY	YB	BR
411.3 V	409.8 V	410.5 V

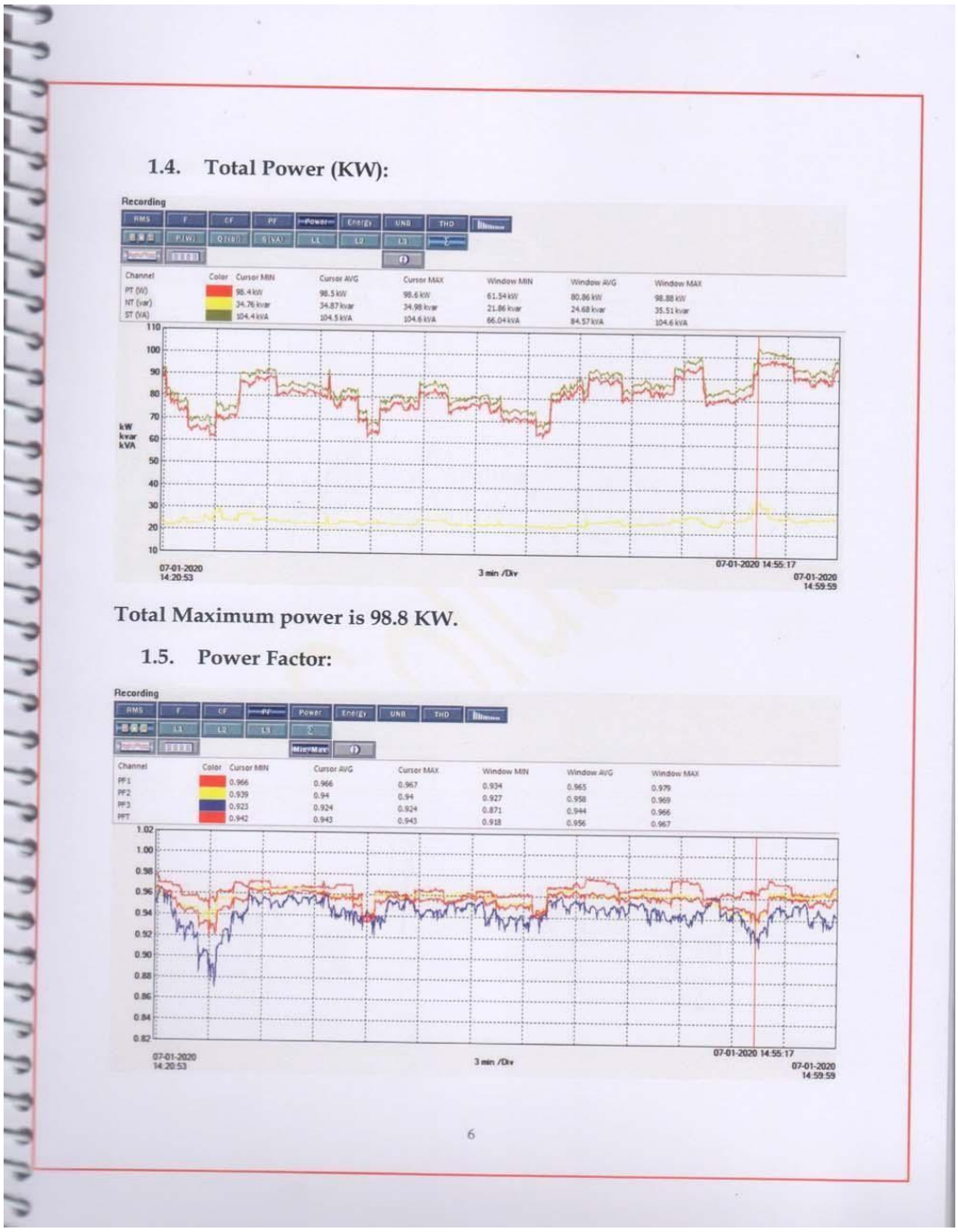


1.2. Phase to Neutral Voltage Readings:

R-N	Y-N	B-N
237.7 V	237 V	236.4

1.3. Current Readings:

R	Y	B	N-E
144.1 A	144.8 A	151.2 A	31.5 A

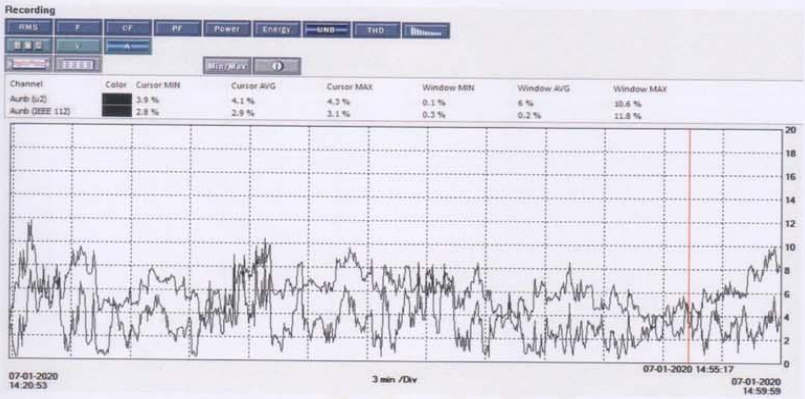


1.4. Total Power (KW):

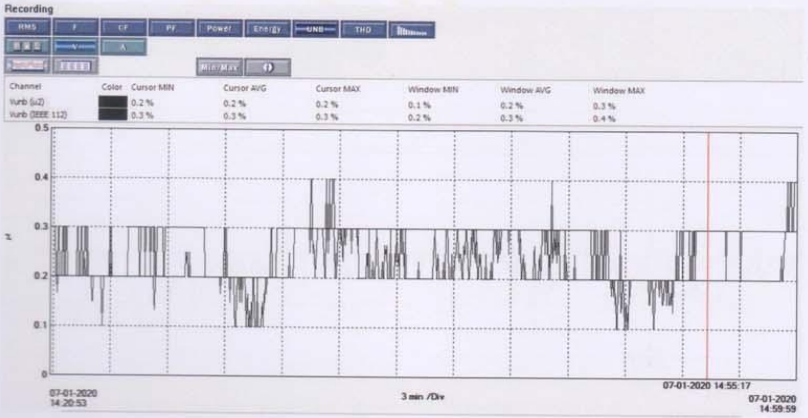
Total Maximum power is 98.8 KW.

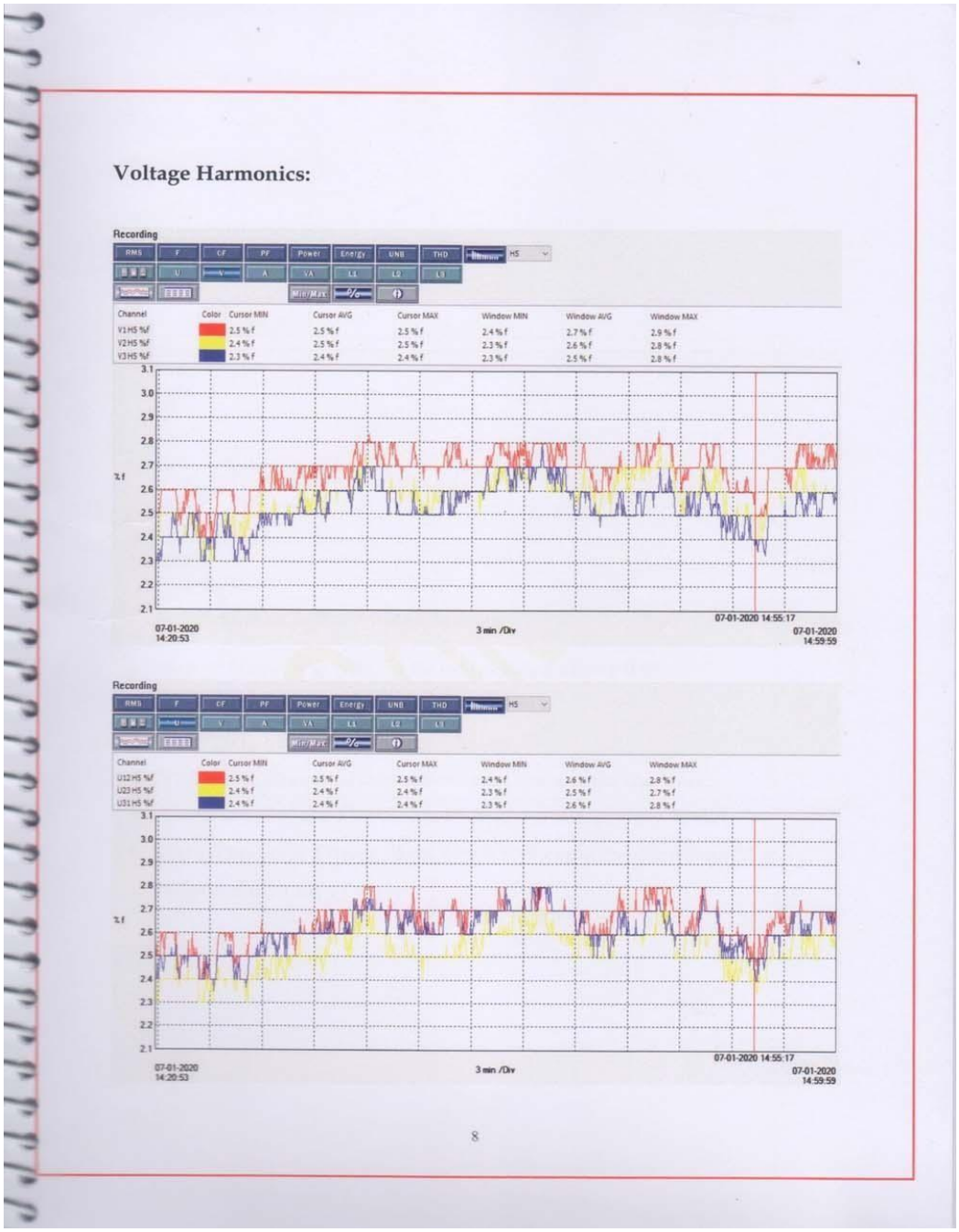
1.5. Power Factor:

Current Unbalance:



Voltage Unbalance:





Voltage Harmonics:

Recording

RMS | F | CF | PF | Power | Energy | UNB | THD | HS

U | A | VA | L1 | L2 | L3

Min/Max | % | i

Channel	Color	Cursor MIN	Cursor AVG	Cursor MAX	Window MIN	Window AVG	Window MAX
V1 HS %f		2.5 % f	2.5 % f	2.5 % f	2.4 % f	2.7 % f	2.9 % f
V2 HS %f		2.4 % f	2.5 % f	2.5 % f	2.3 % f	2.6 % f	2.8 % f
V3 HS %f		2.3 % f	2.4 % f	2.4 % f	2.3 % f	2.5 % f	2.8 % f

Recording

RMS | F | CF | PF | Power | Energy | UNB | THD | HS

U | A | VA | L1 | L2 | L3

Min/Max | % | i

Channel	Color	Cursor MIN	Cursor AVG	Cursor MAX	Window MIN	Window AVG	Window MAX
U12 HS %f		2.5 % f	2.5 % f	2.5 % f	2.4 % f	2.6 % f	2.8 % f
U23 HS %f		2.4 % f	2.4 % f	2.4 % f	2.3 % f	2.5 % f	2.7 % f
U31 HS %f		2.4 % f	2.4 % f	2.4 % f	2.3 % f	2.6 % f	2.8 % f

8

Current Harmonics:

1.6. Remarks & Recommendations:

1. Power factor is good . To be maintained above 0.95
2. Power factor penalty-Nil
3. Voltage is balanced in three phases.
4. Voltage & Current Harmonics level are within the limit.
5. Current unbalance level is within the limit. [below 10%.]
6. Roof Top Solar Power plant of 9.9 KW capacity is connected to Admin Building

HT transformer area

1.Vegetation to be removed

2. Fencing to be painted

3.Silicagel to be replaced

4.Oil filtration data to be updated

HT panel room

1. HT Gloves to be replaced. Date expired
2. First Aid box to be maintained in good condition
3. Unwanted materials to be removed from the Electrical room
4. Sand Buckets to be kept with dry free flow sand
5. Fire extinguishers are due for inspection

II. AMILTA BLOCK:

Service No	05-041-011-536	
	Tariff	Sanction Load
	LM 51	8.16 KW

2.1. Phase to Phase Voltage Readings:

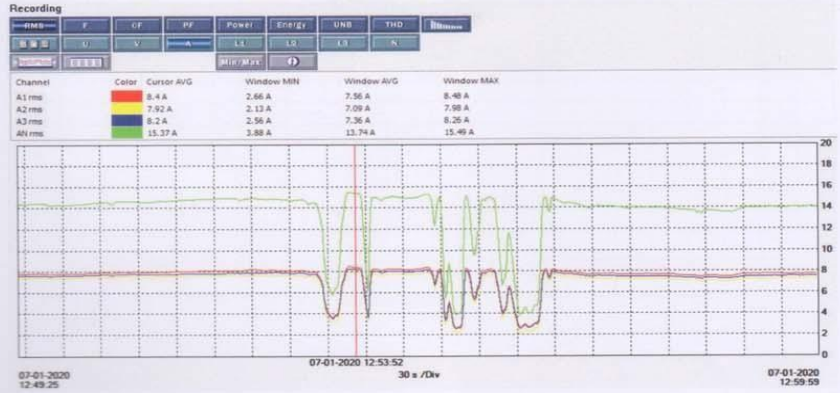
RY	YB	BR
411 V	411.3 V	411.2 V

2.2. Phase to Neutral Voltage Readings:

R-N	Y-N	B-N
236.2 V	236.9 V	239.2 V

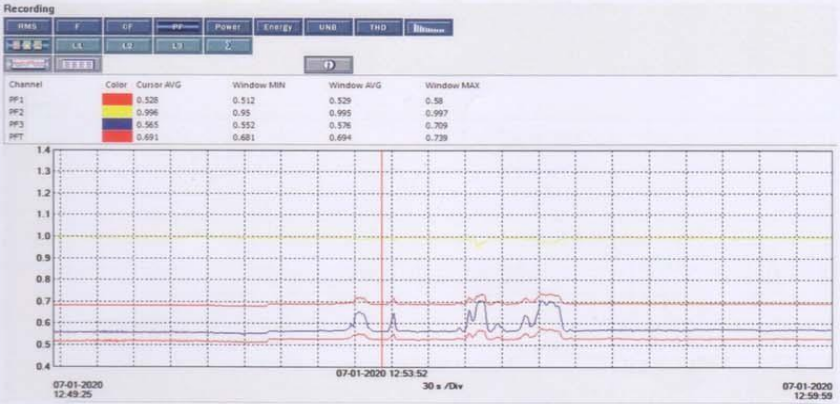
2.3. Current Readings:

R	Y	B	N-E
8.4 A	7.92 A	8.2 A	15.37 A



2.4. Total Power(KW):

2.5. Power Factor:



2.5. Unbalance Current:

2.6. Unbalance Voltage:

2.7. Remarks & Recommendations:

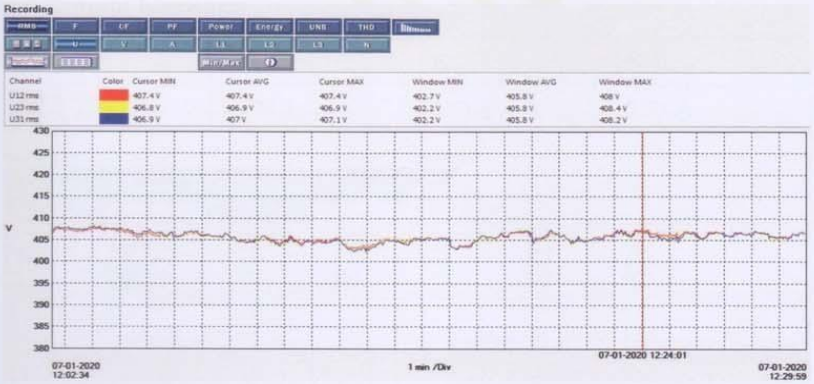
1. During energy audit Power factor is very low 0.694(Average).
   i. R Phase Power Factor is 0.58.
   ii. Y Phase Power Factor is 0.997.
   iii. B Phase Power Factor is 0.709.
2. Average power factor of 0.82 is maintained as per EB bill report.
3. Power factor to be maintained above 0.9
4. Current Unbalance is due to less occupancy during audit.
5. As per last two years power consumption status, the maximum demand reached is 7.82 KW only.(Sanctioned load is 8.16 KW)
6. On Grid Solar Roof Top Power plant of 8 KW capacity is synchronised
7. Solar Bi Directional meter was fixed on 31.07.2019

III. HOSTEL:

Service No	05-041-011-165	
	Tariff	Sanction Load
	LM II B 1	48 KW

3.1. Phase to Phase Voltage Readings:

RY	YB	BR
407.4 V	406.8 V	406.9 V

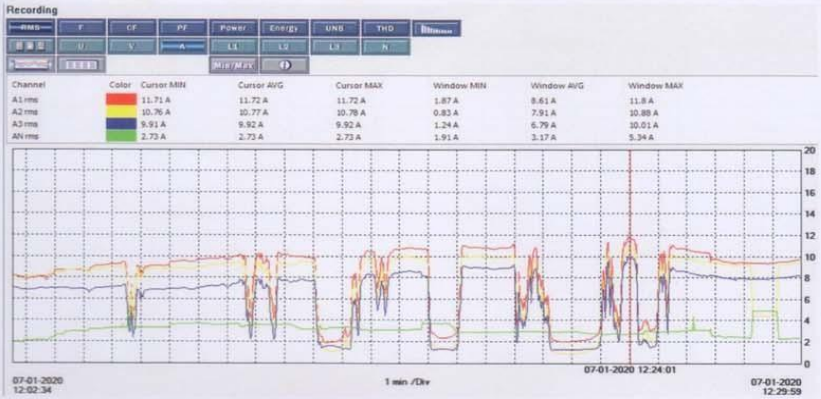


3.2. Phase to Neutral Voltage Readings:

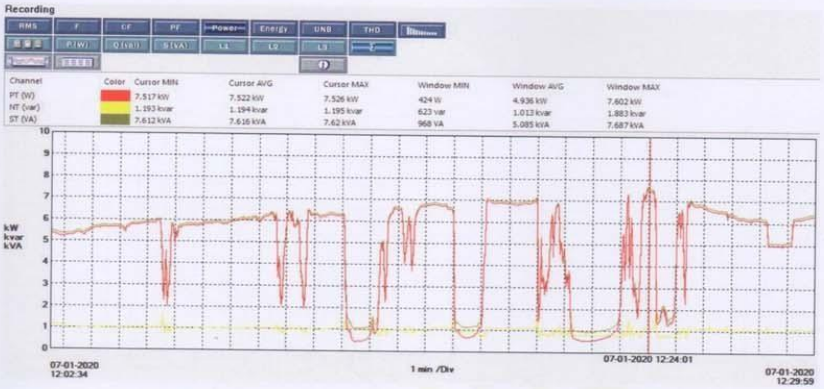
R-N	Y-N	B-N
235.6 V	234.9 V	234.4 V

3.4 .Current Readings:

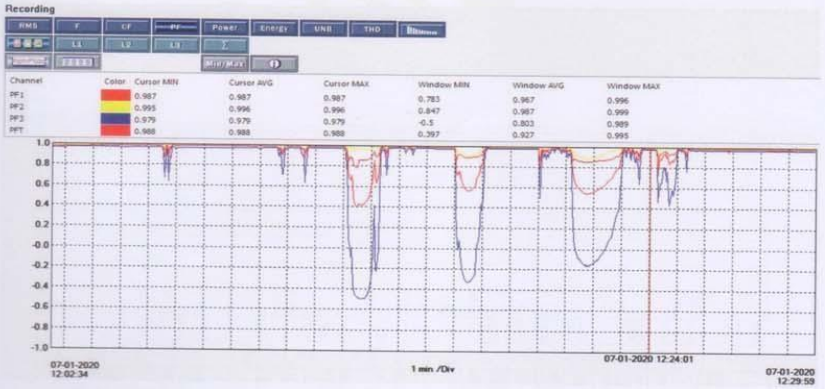
R	Y	B	N-E
11.71 A	10.76 A	9.91A	2.73 A



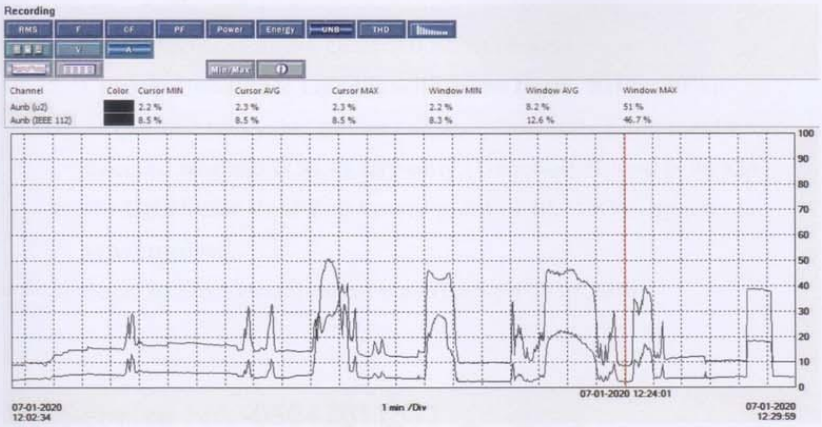
3.5.Total Power (KW):



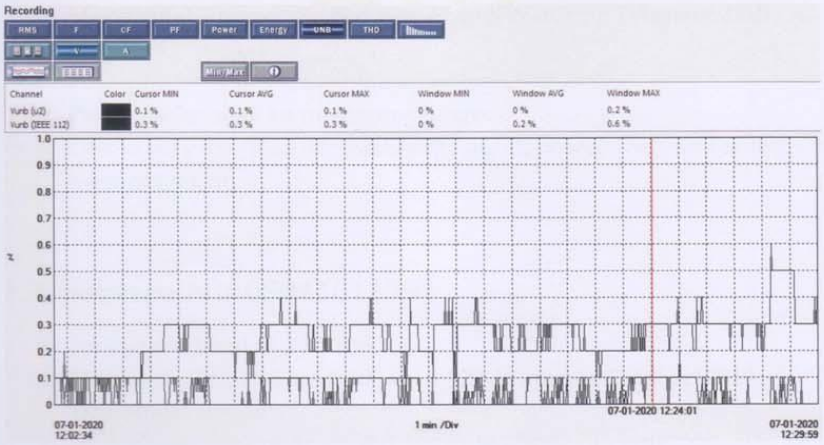
3.5.Power Factor:



3.6.Unbalance Current:



3.7.Unbalance Voltage:



3.8 .Remarks & Recommendations:

1. Power factor is under control 0.927(Average).
2. Current Unbalance Level is within the limit. Below 10%.
3. As per last two years power consumption status, the maximum demand reached is 34.49 KW only.(Sanctioned load is 48 KW)
4. On Grid Solar Roof Top Power plant of 10.24 KW capacity is synchronised
5. Solar Bi Directional meter was fixed on 23.08.2018

LT Service No -05041011571

- Sanctioned Load is 12.64 KW
- Maximum Demand reached was 12.44 KW during February 2018 assessment period
- Power factor is being maintained around 0.85 only.
- Power factor shall be maintained above 0.9
- Due to very low load during Energy audit, power analyser readings were not taken

LT Service No-05041011394

- Sanctioned Load is 1.85 KW
- Maximum Demand reached was 1.92 KW during October 2019 assessment period
- Power consumption is around 100 units/Bi month only

82.5 KVA Generator Room:

- Unwanted Material to be removed from DG area.
- CO_2Fire extinguishers capacities of 2 Kg and 4.5 Kg are due for service
- Earth pit resistance value to be measured and keep tracking it.
- Earth pit identification is required

160 KVA Generator Room:

- Unwanted Material to be removed from DG area.
- CO_2Fire extinguishers capacity of 2 Kg is due for inspection
- Sand buckets to be kept nearby Generator room
- Sand buckets to be kept with dry free flow sand
- Earth pit resistance value to be measured and keep tracking it.
- Earth pit identification is required

275 KVA Generator Room:

- Unwanted Material to be removed from DG area.
- Fire extinguishers 2 Kgs capacities of CO_2 type 2 Nos and 9KG DCP type are due for service
- Sand buckets to be kept with dry free flow sand
- 9KG DCP type fire extinguisher to be kept on wall
- Earth pit identification is required

EB Service K165 room (Hostel)

- In front of fire extinguishers, materials not to be kept
- Fire extinguishers should be easy accessible and operable at any point of time
- Fire extinguishers not to be kept on floor
- In front of Electrical power distribution board, other materials not to be kept and electrical panels should be easy accessible and operable at any point of time
- Broken handle to be replaced in breaker

SAN JOSE BLOCK

Ground Floor UPS room

- Fire Extinguisher to be fixed on wall
- Fire Extinguishers are due for service
- Unwanted materials to be removed from the room
- Petroleum Jelly to be applied on the Battery terminals
- Distilled water to be topped up in batteries

Internet Browsing Centre

- AC air leak through the wooden window to be arrested

Computer Lab

- Fire Extinguishers are due for service

EB Bus Bar Power Room

- Distribution board to be easily accessible
- Room is fully occupied with unwanted materials. To be removed

SANCTA MARIA BLOCK

- AMC details about the UPS and Batteries to be made available.
- 6KG DCP Fire Extinguisher is due for service

WEAT Office Battery Room

- Extinguisher to be provided
- Unwanted materials to be removed from the room

ADMIN BLOCK G Floor Battery Room

- AC cooling coils insulation faults to be rectified

ADMIN BLOCK Dean Office battery room

- 20 KVA UPS system not in service
- All batteries are in dry and non-operable conditions

ADMIN BLOCK Chemistry Lab

- Inverter not in on condition

ADMIN BLOCK Physics Lab

- 3 KVA Inverter not in service

MARINA BLOCK

- 3 KVA Inverter sent for service

BENEDICTA BLOCK Battery Room

- Water entry from outside to be avoided

RO Plant

RO reject water from Admin building and Marina block building are being used for garden.

MARIETTA BLOCK

- Extinguisher kept on stair case. To be kept on wall
- Sand bucket to kept with dry free flowing sand.

Gas cylinder storage area

- Fire Extinguisher not available
- Sand bucket to kept with dry free flowing sand.

Solar Water heater-150LPD

Hot water from Solar water heater is being utilised effectively

Solar Street Lights

Two numbers Solar Street lights (ADMIN BLOCK) are not glowing.

Batteries are in dry condition. To be replaced

Solar Power plants

1. On Grid Solar Roof Top power plant of 9.9 KW at Admin Building

Solar Power Generation as on 16.12.2019 is 10,835 units

CO_2 emission avoided so far 6531 Kgs

2. On Grid Solar Roof Top power plant of 10.24 KW at Hostel MADONA BLOCK

Solar power plant is connected to service Number 05041011165

Bi directional meter fixed by TNEB on 23.08.2018

Solar Power Generation as on 07.01.2020 is 7,040 units

Solar Power Exported to TNEB Grid as on 07.01.2020 is 2519 units (from 23.08.2018)

CO_2 emission avoided so far 1511 Kgs

3. On Grid Solar Roof Top power plant of 8 KW at Hostel AMALITTA BLOCK

Solar power plant is connected to service Number 05041011536

Bi directional meter fixed by TNEB on 31.07.2019

Solar Power Generation as on 07.01.2020 is 3,316 units

Solar Power Exported to TNEB Grid as on 07.01.2020 is 1,219 units (from 31.07.2019)

CO_2 emission avoided so far 731 Kgs

4. Off Grid Solar Roof Top power plant of 1.92 KW at Hostel MARIETTA BLOCK

Bio Gas Plant

Biogas output - 20M³/ Day

Food/Vegetable waste -150 KG/Day

LPG Equivalent-10KG/Day

CO_2 Offset -68985 to 76650 KG /Year

Bio gas generation as on 17.12.2019 is 1334 M³

Lightning arrestor

Lightning arrestor system provided inside the campus in the following building top

ADMIN BLOCK Entrance

GOLDEN JUBLIEE HALL

MARINA BLOCK

MAUREEN BLOCK

ADMIN BLOCK Solar Power plant area

MADONA BLOCK Solar Power Plant area

AMALITTA BLOCK Solar Power Plant area

Physical verification of Lightning arrestor continuity checked. Ok

Energy Saving activities implemented

1.ADMIN BLOCK all fans are replaced with Energy saving Super fans

2.ADMIN BLOCK all conventional tube lights are replaced with LED tube lights

3.Hostel AMALITTA BLOCK all rooms are provided with Energy saving Super fans

4.Hostel

AMALITTA BLOCK,
MADONA BLOCK ,
ANNUNCIATA BLOCK
MARIETTA BLOCK

} All rooms are provided with LED tube lights

5.On Grid Solar Roof Top power plant of 9.9 KW at ADMIN BLOCK

6. On Grid Solar Roof Top power plant of 10.24 KW at Hostel MADONA BLOCK

7. On Grid Solar Roof Top power plant of 8 KW at Hostel AMALITTA BLOCK

8. Off Grid Solar Roof Top power plant of 1.92 KW at Hostel MARIETTA BLOCK

9.Solar Water Heater capacity of 150Liters per Day

10. Solar Street Lights -10 Nos

11.Bio Gas plant at Hostel Mess - Biogas output - 20M^3/ Day

12.Three Rainwater storage pits having capacity of 9000 Cuft, 3600 Cuft and 720 Cuft are being utilised effectively

13. RO reject water is being used for garden

Energy Saving Potentials

- Balance conventional Fans shall be replaced with energy efficient fans in periodical manner
- Left over Conventional Tube lights shall be replaced with LED tube lights in spaced manner
- Additional solar power plant shall be planned
- Solar water heater shall be planned for preheating before cooking in Hostel and canteen
- Energy efficient Air conditioner shall be planned in future (5 star rating)
- Existing 1.92 KW off grid solar power plant to be utilised effectively
- By creating more awareness among students and all teaching & non-teaching staffs about the importance of energy savings , fans and tube lights shall be used efficiently
- Halogens lamps shall be replaced with LED lights

General Recommendations:

Battery Room:

1. History card to be maintained for all UPS and batteries. Distilled water to be added periodically to avoid dry condition and failure.
2. Battery Purchase details, Warranty periods to be maintained.
3. Petroleum Jelly to be applied on Battery terminals to avoid corrosion
4. Combustible Materials not to be kept inside Battery room.
5. Unwanted materials to be removed from battery room.
6. Battery room to be kept neat & clean.
7. Cable identification tag to be provided.
8. Proper ventilation to be ensured
9. Extinguisher to be kept on wall
10. Extinguishers to be easily accessible
11. Extinguishers to be inspected on regular basis

General Awareness Programmes:

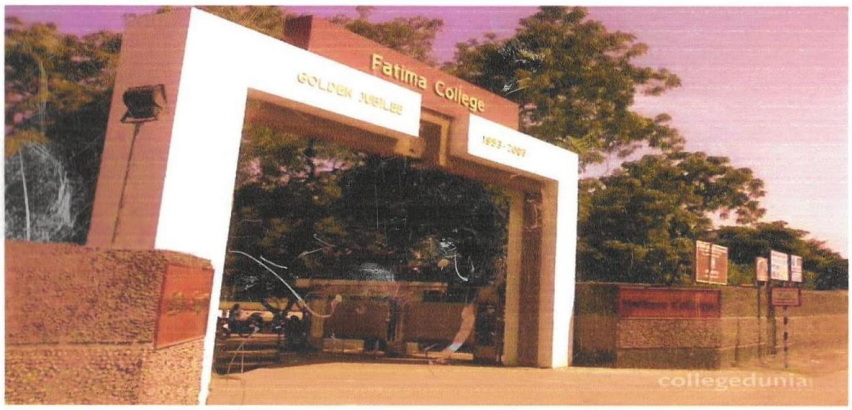
1. More display on Water conservation awareness shall be put.
2. Energy conservation program for all staffs shall be planned.
3. Hands on training to operate Fire Extinguishers shall be given to all teaching and non-teaching staffs.
4. Availability and Locations of Fire Extinguishers, Hose Reel & Sand Buckets shall be displayed
5. Display on Emergency contact numbers shall be posted on prominent places.

3. Environment Audit

ENVIRONMENTAL AUDIT AND GREEN AUDIT REPORT

March 2020

For



FATIMA COLLEGE
Mary Land
Madurai-625018.

Audited by

Mr. C. Jebaraj B.Tech.,
TJ Solutions,
4/101, Raja Sir Muthiah Nagar,
Bye-pass road, Ellis Nagar,
Madurai - 625 016.

ACKNOWLEDGEMENT

TJ Solutions, Madurai are thankful to the Principal for giving us the opportunity to carry out Environmental Audit and Green audit of FATIMA COLLEGE, Mary Land, Madurai, Tamil Nadu 625018. Without whose keen interest, this audit would not have been possible.

TJ Solutions team are also thankful to all Teaching & Non-Teaching Staffs and students of the FATIMA COLLEGE for their wholehearted support, hospitality and the courtesy extended to the Audit team during the course of the study.

The following officers from TJ Solutions under the guidance of Mr. C. Jebaraj B. Tech., have carried out the Audit.

Name	Qualifications
Mr. C. Jebaraj	B.Tech., PGDEM.,DIS., Certified Energy Auditor, EHS & 5S Consultant
Mrs. T. Tamil Selva Parvathi	MSc., DTC.,

C. Jebaraj
EAM - 9847

TJ Solutions Madurai-10

CONTENTS

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 days 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 colleges can also create a variety of adverse environmental impacts.

Environmental audit and Green auditing is a process whereby an organisation's environmental performance is tested against its environmental policies and objectives. Environmental audit and Green audit is defined as an official examination of the effects a college has on the environment. As a part of such practice, internal environmental audit and Green Audit is conducted to evaluate the actual scenario at the campus.

Environmental audit and Green audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college 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.

Environmental audit and Green auditing and the implementation of mitigation measures is a win-win situation for all the college, 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 Environmental impact on campus.

Environmental audit and 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. It is imperative that the college 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 Fatima College, Madurai the audit process involved initial interviews with management to clarify policies, activities, records and the cooperation of staff and students in the implementation of mitigation measures.

This was followed by staff and student interviews, collection of data through the questionnaire, review of records, observation of practices and observable outcomes.

In addition, the approach ensured that the management and staff are active participants in the environmental audit and green auditing process in the college. The baseline data prepared for the Fatima College, Madurai will be a useful tool for campus greening, resource management, planning of future projects and a document for implementation of sustainable development of the college. Existing data will allow the college 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 environmental audit and green audit recommendations.

We are happy to submit this environmental audit and green audit report to the Fatima College authorities.

TJ Solutions

Madurai

TJ Solutions Madurai-10

1. INTRODUCTION

Fatima College, Mary Land, Madurai is a Catholic minority Institution, established and run by the Sisters of St. Joseph's Society of Lyons. Today the sisters are present in 48 countries, responding to the signs of the times and the needs of the people. The Charism of the sisters of St. Joseph of Lyons is unioning Love expressed in greatest charity and Deepest Humility. In India, there is one Province in the South of India and a Region in the North of India. The sisters are involved in Educational, Social Action, Pastoral, Family apostolate ministries empowering the marginalized women and children.

Fatima College, affiliated to Madurai Kamaraj University, was the dream of Sr. Rose Benedicte, the founder of the College, realized 66 years ago. With more than half a century of experience in the field of education, Fatima College has established a reputation for excellence in all aspects of higher education. It has endeared itself to the People of Madurai by imparting value based holistic education to young women with the objective of giving preference to the rural and economically backward women and first generation learners.

The College was started in St. Joseph's Campus Madurai as a Second Grade College with 63 students in 1953. It was upgraded into a Post Graduate College in 1964; Autonomous in 1990 and a Research Institute in 2004. The College now offers 21 Undergraduate Courses, 14 Postgraduate Courses, 2 Professional Courses, 5 M.Phil. Programmes and 6 Departments have become Research Centres. It has strength of 4510 Students, 204 Teaching Staff and 95 Non-Teaching Staff.

The College is administered and oriented by St. Joseph's Society presided by the Provincial.

1.1 VISION AND MISSION

VISION

" WOMEN'S EMPOWERMENT THROUGH EDUCATION"

To empower women by ***developing human capabilities*** through quality education based on Christian values, making them ***responsible citizens*** who can work for the advancement of the society and ***promote communal harmony*** in the multi-religious and multi -cultural reality of India eventually evolving into women of communion

MISSION

- To enhance quality of life through the development of individuals
- To enable women to become contributors in the economic, social and political development of India
- To equip the students with 21st century skill-sets with a focus on problem-solving abilities.
- To motivate them to work for social justice.
- To give preference to the rural, economically backward and first -generation learners.
- To enable students to be employed in the technology oriented, competitive market

MOTTO

Lead Kindly Light

1.2 Total Campus Area & College Building Spread Area

Campus area 37 Acres

Built up area 43,397.47 sqmt.

List of Places from where Students Commute

Aathikulam	Ahimsapuram	Alagappannagar
Alanganallur	Alwarpuram	Anaiyur
Anna Nagar	Anuppanadi	Arappalayam
Arasaradi	Avaniyapuram	Balajinagar
Balaranganathapuram	BB Kulam	Bethaniyapuram
Chokkalinganagar	Chekkaruni	Chokkikulam
Doak Nagar	Duraisamy nagar	Ellisnagar
Goripalayam	Harvey patti	Iravadanallur
Ismailpuram	Jaihindpuram	Kadachannendal
Karuppaurani	Kathirvel Nagar	Keeraidurai
KK Nagar	Kochadai	Koodal Nagar
Kovalan nagar	K Pudur	Lakshmipuram
Lourdhu Nagar	Madakulam	Mandelanagar
Masthanpatti	Meenakshi puram	Meenambalpuram
Melamadai	Melur	Nagamalai Puthukottai
Haganakulam	Narimedu	Othakadai
Palamedu	Palanganatham	Pandhalkudi
Park Town	Pasumalai	Periyar Nagar
Ponmeni	Ponnagaram	P & T Colony

Railway colony	Reserve line	Sakkimangalam
S Alankulam	Samayanallur	Sellur
Silaiman	SS Colony	Subramaniyapuram
Suryanagar	Surveyor colony	Thathaneri
Thirumangalam	Thirunagar	Thirupalai
Thiruparankundram	TVS Nagar	Umatchikulam
Uthangudi	Vandiyur	Vasanthanagar
Veerapanjan	Vilangudi	Villapuram
Visalakshminagar	Viswasapuri	

TNSTC running buses for morning session from Thirunagar, Anupanadi and Ellis Nagar to college campus and similarly for evening session from Thirunagar and Anupanadi to cover the maximum students' residential area

1.3 NAAC Grading

ReAccredited with A Grade by NAAC (3rd Cycle)

94th Rank in India Ranking 2019 (NIRF) by MHRD

1.4 Campus Infrastructure

Library

LIBRARY AREA : 22, 436.13 sqft.

KNOWLEDGE RESOURCES

Resources	Rosa Mystica Library	S. F. Library
Total Books	1,02,163	29,751
Advanced Text Books	72,412	16,122
Reference Materials	5,126	1,590
Book Bank Books	9,182	10,693
General Books	23,050	860
Special Collections	2,560	400
E-Resources	2,147	800
E-Journals	4	J-Gate Package
Foreign Journals	4	22
Serials	164	63
Back Volume Journals	5,973	2,195
Gratis	8,960	86
Theses	684	2,725
E-Theses	683	585

CLASSIFICATION

- Scheme of classification is DDC (Dewey decimal classification)
- Scheme of cataloguing is AARC2 (Anglo American Cataloguing Rules)
- Bibliographic formats are MARC-21 (Machine-Readable Catalogue 21st Century)

DEPARTMENTAL LIBRARY

Rosa Mystica Library has an unique feature of maintaining four Departmental Libraries viz Physics, Chemistry, Zoology and Home Science. There libraries are established with the main objective of facilitating the staff and students in the promotion of research and projects. The total volume of Books are,

Physics	1,589
Chemistry	1,187
Zoology	2,368
Home Science	2,083

Head of the department and all the department staff are responsible for the Issue and Return of the books.

SOFTWARE USED

NIRMALS : Network Information Resources Management of Academic Library

BLOG: https://www.fcrosamysticalibrary.blogspot.in

Computer Labs

There are four well-equipped computer labs associated with the Departments of Management, Computer Application, Physics and Chemistry.

Canteen

The college have two canteens which caters to the nutritional needs of the staff and students at nominal price. The canteen functions from 8.30 am to 5.30 pm.

Hostel

The girl students are provided neat and safe residential accommodation at seven well equipped convent hostels in the vicinity of the college.

Sports and Games facilities

The College has a 400 meters Track & Field, Basket Ball Court, Volley Ball Court, Shuttle Badminton Court, Football Field, Fitness Centre, Table Tennis etc.

Green House and Herbal Garden

The botanical garden has a collection of rare herbs, shrubs, plants and trees.

Other facilities

Indian Bank ATM facility functions adjacent to the college campus is available.

The centralized communication system with EPABX of 100 lines capacity keeps all the departments and all the other Administrative Offices connected.

2. PRE-AUDIT STAGE

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 environmental audit and green audit because it is the first opportunity to meet the auditee and deal with any concerns. The meeting was an opportunity to gather information that the audit team can study before arriving on the site. The audit protocol and audit plan was handed over at this meeting and discussed in advance of the audit itself. In Fatima College pre-audit meeting was conducted successfully and necessary documents were collected directly from the college before the initiation of the audit processes. Actual planning of audit processes were discussed in the pre-audit meeting. Audit team was also selected in this meeting with the help of staff and the college management. The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself. The audit team worked together, under the leadership of the lead auditor, to ensure completion within the brief and scope of the audit.

2.1 Management's Commitment

The Management of the college has shown the commitment towards the environmental audit and 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 and planting more trees on the campus etc., after the environmental audit and green auditing. The management of the college was willing to formulate policies based on audit report.

2.2 Scope & Goals of Environmental Audit and Green 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. Environmental audit and 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 economic, financial, social, environmental factor. It is necessary to conduct environmental audit and green audit in college campus because students become aware of the environmental audit and green audit, its advantages to save the planet and they become good citizen of our country. Thus Environmental audit and Green audit becomes necessary at the college level. A very simple indigenized system has been devised to monitor the environmental performance of Fatima College, Madurai. It comes with a series of questions to be answered. This innovative scheme is user friendly. The aim of this is to help the institution to set environmental examples for the community and to educate the young learners.

2 .3 Benefits of the Environmental Audit and Green Auditing

- More efficient resource management
- To provide basis for improved sustainability
- 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
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- Enhance the alertness for environmental guidelines and duties
- Impart environmental education through systematic environmental management approach and Improving environmental standards
- Benchmarking for environmental protection initiatives
- Financial savings through a reduction in resource use
- Development of ownership, personal and social responsibility for the College and its environment
- Enhancement of college profile
- Developing an environmental ethic and value systems in youngsters.
- Environmental audit and Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the college.

2.4 Target Areas of Environmental Audit and Green Auditing

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

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. 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.

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.

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.

Auditing for Waste Management

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 of 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 college. It is therefore essential that any environmentally responsible institution examine its waste processing practices.

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. 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.

Auditing for Carbon Footprint

Commutation of stakeholders has an impact on the environment through the emission of greenhouse gases into the atmosphere consequent to burning of fossil fuels (such as petrol). The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising around 400 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions.

An important aspect of doing an audit is to be able to measure your impact so that we can determine better ways to manage the impact. In addition to the water, waste, energy and biodiversity audits we can also determine what our carbon footprint is, based on the amount of carbon emissions created. One aspect is to consider the distance and method travelled between home and college every day. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is necessary to know how much the organization is contributing towards sustainable development. It is therefore essential that any environmentally responsible institution examine its carbon footprint.

2.5 Methodology of Environmental audit and Green Auditing

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Environmental and Green Policy adopted by the institution. The criteria, methods and recommendations used in the audit were based on the identified risks. The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the document, interviewing responsible persons and data analysis, measurements and recommendations. The methodology adopted for this audit was a three step process comprising of:

1. Data Collection – In preliminary data collection phase, exhaustive data collection was performed using different tools such as observation, measurements and survey communicating with responsible persons.

Following steps were taken for data collection:

- The team went to each department, centres, Library, canteen etc.
- Data about the general information was collected by observation and interview.
- The power consumption of appliances was recorded by taking an average value in some cases.

2. Data Analysis - Detailed analysis of data collected include : calculation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by the State Electricity Board. Data related to water usages were also analysed using appropriate methodology.

3. Recommendation – On the basis of results of data analysis and observations, some steps for reducing power and water consumption were recommended. Proper treatments for waste were also suggested. Use of fossil fuels has to be reduced for the sake of community health. The above target areas particular to the college was evaluated through questionnaire circulated among the students for data collection. Five categories of questionnaires were distributed.

3. AUDIT STAGE

In Fatima College environmental audit and green auditing was done with the help of TJ solutions involving different student groups, teaching and non-teaching staff. The audit began with the teams walking through all the different facilities at the college, determining the different types of appliances and utilities as well as measuring the usage per item and identifying the relevant consumption patterns and their impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified to clarify the data received through survey and discussions.

3.1 Student Clubs and Forums Involved

Green Club, Eco Sustainability Club, N.S.S, N.C.C, Reach out to the society through Action (ROSA) and Department level associations.

3.2 Comments on Site Tour

Site inspection was done along with students and staff. Questionnaires were answered during the site tour. Students and staff took much interest in the data collection processes. It was quite interesting and fascinating. It was an environmental awareness program for the students who participated in the auditing. The experience of environmental audit and green auditing was totally a new experience for most of the students. They have shared their expectations about a green campus and gave suggestions for the audit recommendations.

3.3 Review of Documents and Records

Documents such as electricity and water charge remittance, laboratory equipment registers, audited statements and office registers were examined and data were collected. College calendars, college magazines, annual report of the college and NAAC self-assessment reports, UGC report etc. were also verified as part of data collection.

3.4 Review of Policies

Discussions were made with the college management regarding their policies on environmental management. Future plans of the college were also discussed. The management would formulate a environment / green policy for the college in the light of environmental audit and green auditing. The purpose of the audit was to ensure that the practices followed in the campus are to be in accordance with the Policy adopted by the institution.

3.5 Interviews

In order to collect information for auditing different audit groups interviewed office staff, teaching and non-teaching staff, students and other stakeholders of the college.

3.6 Site inspection

College and its premises were visited and analysed by the audit-teams several times to gather information. Campus trees were counted and identified. Vegetable garden, play grounds, canteen, library, office rooms and parking grounds were also visited to collect data. Number and type of vehicles used by the stakeholders were counted. Number of LPG cylinders used in labs, canteen and hostel kitchen were also counted. Leakage of a few water taps were noticed during the site inspection.

4. POST AUDIT STAGE

The base of any environmental audit and green audit is that its findings are supported by documents and verifiable information. The audit process seeks, on a sampled basis, to track past actions, activities, events, and procedures to ensure that they are carried out according to systems requirements and in the correct manner.

Environmental audit and Green audits form a part of a process. Although they are individual events, the real value of audits is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Although audits are carried out using policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit. The essence of any environmental audit and green audit is to find out how well the environmental organisation, environmental management and environmental equipment are performing.

Each of the three components are crucial in ensuring that the organisation's environmental performance meets the goals set in its green policy. The individual functioning and the success of integration will all play a role in the degree of success or failure of the organisation's environmental performance.

4.1 Key Findings and Observations

a) Water

❖ Main water uses in the college campus

Drinking,

Garden,

Laboratories,

Canteen,

Cleaning,

Toilets, Bathrooms,

Construction works

❖ Main water uses in the Hostel

Toilets, Bathrooms,

Washing of clothes ,

Drinking,

Cooking,

Garden

- ❖ Analysis of Drinking water, borewell water and corporation water samples are done
- ❖ Water cooler with drinking water filtration is installed (15 numbers).
- ❖ Number of urinals and toilets –110
- ❖ Number of water taps –162
- ❖ Number of wells – 5 tube well
- ❖ Number of ponds -Nil
- ❖ Water pumps – 5HP-2 Nos, 7HP -3 Nos.
- ❖ Quantity of water pumped from borewells – 18,000 litres/day
- ❖ Water purchased- 36,000 litres/Day
- ❖ Number of water tanks for water storage -15

2,000L -4 Nos

4,000L- 5 Nos

5,000L- 5 Nos

1,000L- 1 No

- ❖ Amount of water stored – 54,000 L

Reasons for water wastage

- Leakages from taps
- Over use of water
- Overflow of water from tanks

b) Energy

Electrical Energy consumption in the college

SL No	Month	Power consumption
1	September -2019	33,096 units
2	October-2019	27,296 units
3	November-2019	22,685 units
4	February-2020	28,682 units

Electrical Energy consumption in the hostel

Service No. 05-041-011-536

Assessment Date	Energy consumed in units	Assessment Date	Energy Consumed in units
26.02.2020	3,720	26.02.2019	4,180
26.12.2019	3,680	27.12.2018	3,580
25.10.2019	4,880	26.10.2018	5,070
29.08.2019	5,994	30.08.2018	5,430
27.06.2019	1,590	27.06.2018	1,740
25.04.2019	4,540	27.04.2018	5,770
Total	24,404		25,710
Average/Month	2,034		2,142

Service No. 05-041-011-165

Assessment Date	Energy consumed in units	Assessment Date	Energy Consumed in units
27.02.2020	15,400	27.02.2019	13,760
26.12.2019	14,780	27.12.2018	15,600
25.10.2019	18,220	26.10.2018	18,618
29.08.2019	18,630	30.08.2018	23,213
27.06.2019	5,850	27.06.2018	6,960
25.04.2019	18,890	27.04.2018	23,130
Total	91,770		1,01,281
Average /Month	7,648		8,440

Service no 05-041-011-571

Assessment Date	Energy consumed in units	Assessment Date	Energy Consumed in units
26.02.2020	3,010	26.02.2019	3,960
26.12.2019	3,100	27.12.2018	3,230
25.10.2019	3,630	26.10.2018	3,790
29.08.2019	4,110	30.08.2018	4,810
27.06.2019	1,820	27.06.2018	1,930
25.04.2019	4,010	27.04.2018	4,950
Total	19,680		22,670
Average/Month	1,640		1,889

❖ Number of LP Gas cylinders used in the Hostel per month – 18

Number of LP Gas cylinders used in the college per month – 1

❖ Number of Diesel Generators (DG) – 3 (82.5 KVA-1, 160 KVA-1 & 275 KVA-1)

Diesel consumption per month is very less due to very less power failure

❖ Solar power plant (On Grid) installed to generate power – 8.16+9.9+10.24 = 28.3kW

Solar power plant (Off Grid) installed to generate power – 1.92 kW

❖ Biogas plant installed to generate gas from the food waste- one
Capacity is 20 M^3/ Day

c)Waste

Quantity of waste generated:-
Office

❖ Biodegradable – <1kg/day

❖ Non-biodegradable –< 0.5kg/day

Labs

❖ Biodegradable – < 5kg/day

❖ Non-biodegradable –< 0.5 kg/day

❖ Hazardous waste –< 100 ml/day

Canteen

❖ Biodegradable college canteen –30 kg/day

❖ Non-biodegradable – < 1kg/day

Hostel

❖ Biodegradable college canteen –70 kg/day

❖ Non-biodegradable – < 2kg/day

Open area

Biodegradable(Dry leaves)- 10 Kgs/Day

Waste disposal

- E-wastes- computers, electrical and electronic parts – Buy back method is followed
- Plastic waste- Plastic free campus, Plastic waste generated through packing of lab equipment's, empty chemical containers etc are disposed periodically
- Solid wastes generated from damaged furniture, paper waste, paper plates – to Municipal waste collection system
- Food waste from Hostel is utilised in Bio gas Plant
- Food waste from canteen is sent to compost yard
- Dry leaves from the open area- sent to compost yard
- Glass waste from Broken glass wares are disposed periodically through municipal waste collection system
- Napkins are burnt in the incinerators
- Laboratory waste water is being sent through public sewer drainage system
- Waste water generated from washing, urinals, bathrooms are sent through public sewer drainage system

d) Green Campus

Species Planted by the Students

Neem Tree -8, Mahagani -5, Gooseberry- 4

Medical plant garden

No of plants-45

Alvera garden is being maintained

Campus Trees

Sl. NO	BOTANICAL NAME	COMMON NAME	NUMBER
1.	Acacia catechu	Khair	1
2.	Achras sapota	Sapota	8
3.	Adenathera pavonina	Coral Tree	6
4.	Ailanthus altissima	Tree of Heaven	1
5.	Alangium salvifolium	Sage Leaved Alangium	1
6.	Albizia lebbeck	Indian Siris	20
7.	Alstonia scholaris	Devil Tree	1
8.	Artocarpus heterophyllus	Jack fruit	1
9.	Azadirachta indica	Neem Tree	405
10.	Bambusa vulgaris	Bamboo	2
11.	Bauhinia purpurea	Orchid Tree	2
12.	Bauhinia tomentosa	Yellow Orchid Tree	6
13.	Bombax ceiba	Silk Cotton Tree	2
14.	Borassus flabellifer	Palmyrah Palm	1
15.	Butea monosperma	Flame Of The Forest	1
16.	Calystemone lanceolatus	Bottle Brush	2
17.	Cassia fistula	Golden Shower	40
18.	Cassia javanica	Javamese Cassia	4
19.	Cassia siamea	Iron wood	4

20.	Casuarina equisetifolia	Australian Pine	94
21.	Coccus nucifera	Coconut Tree	8
22.	Cordia sebastina	Geiger Tree	15
23.	Crateva religiosa	Mavalingam	2
24.	Crescentia cujete	Calabash	2
25.	Cycas revoluta	Sago Palm	6
26.	Dalbergia sisoo	Rose Wood	3
27.	Delonix regia	Gulmohar	50
28.	Emblica officinalis	Indian Gooseberry	2
29.	Ferronia elephantum	Wood Apple	1
30.	Ficus microcarpa	Indian Laurel Ithi	2
31.	Ficus religiosa	Pipal	2
32.	Gossypium arboreum	Tree cotton	8
33.	Hardwickia binata	Anjan	2
34.	Holarrhena antidysenterica	Kurchi	1
35.	Holoptelea integrifolia	Indian elm	1
36.	Madhuca latifolia	South Indian Mahua	10
37.	Majedea zanguebarica	Black Pearl Tree	1
38.	Mangifera indica	Mango	4
39.	Melia azedarach	Persian Lilac	1
40.	Mimusops elengi	Spanish Tree	10
41.	Morinda tinctoria	India Mulberry	60

42.	Moringa oleifera	Drumstick	14
43.	Murraya koenigii	Curry Leaves	4
44.	Neolamarckia cadamba	Kadambam	2
45.	Parkia biglandulosa	Ball Badminton Tree	1
46.	Peltophorum pterocarpum	Copper Pod	110
47.	Phoenix pusilla	Date Palm	1
48.	Polyalthia longifolia	False Ashoka	26
49.	Prosopis cineraria	Khejri	2
50.	Psidium guajava	Guava	1
51.	Pterocarpus santalinus	Red Sander	1
52.	Pungamia pinnata	Pungamia	185
53.	Roystonea regia	Royal Palm	14
54.	Samanea saman	Rain Tree	20
55.	Santalum album	Sandal Wood	1
56.	Scaevola frutescens	Badraksh	1
57.	Shorea robusta	Sal	1
58.	Simarouba glauca	Paradise Tree	8
59.	Spathodea companulata	African Tulip Tree	1
60.	Syzygium cumini	Jamun	15
61.	Tabebuia impetiginosa	Trumpet Tree	1
62.	Tamarindus indica	Tamarind Tree	47
63.	Tectona grandis	Teak Wood	20

64.	Terminalia bellerica	Belleric myrobolan	1
65.	Terminalia catappa	Badam Tree	10
66.	Terminalia crenulata	Karu Maruthu	1
67.	Terminalia arjuna	Ajuna	1
68.	Thespesia populnea	Portia	1
69.	Ziziphus jujuba	Indian Jujube	3
70.	Phyllanthus acidus	Star gooseberry	2
71.	Cassia auriculiformis	Ear leaf cassia	1
72.	Calliandra emarginata	Dwarf powder puff	2
73.	Scaevola frutescens	Beach cabbage	1
74.	Saraca indica	Ashoka tree	1
75.	Lagerstroemia speciosa	Crape myrtle	1
76.	Michelia champaca	champak	1
77.	Gossypium arboreum	Tree cotton	6
78.	Khaya senegalensis	Khaya	1
79.	Pithacellobium dulce	Manilla tamarind	1
80.	Ficus benjamina	Weeping fig	4
81.	Aegle marmelos	stone apple	1
82.	Murraya exotica	Orange jasmine	1
83.	Cresentia cujete	Kalabash tree	2
84.	Jatropha curcas	Physic nut	1
85.	Jatropha multifida	Coral plant	1

86.	Lawsomia inermis	Henna tree	2
87.	Nerium oleander	Oleander	20
88.	Tecoma stans	Yellow bell	1

Routine Green Practices

World Environment Day – June 5

Awareness seminars are organized on various environmental problems.

Distribution of fruit trees, poster exhibition etc. are some activities on that day.

Ozone Day – September 16

Conducted poster competition, Invited lectures etc.

The Green campus drive is an initiative of the college to protect the environment. The college has been declared as a 'No Plastic' zone. The campus protects age old trees in addition to several new trees and plants planted. The campus is lush green with gardens, lawns, flowers and plants wherever there is open space. Bio-degradable waste is collected and made into compost. Non-degradable and electronic waste and toxic materials are regularly disposed of. The Nature club of the college has named all the flora of the campus. Important days like World Environment Day, Ozone Day etc are observed and several programmes including processions with placards, competitions and street plays are conducted by various departments and the Nature Club to create awareness in environment protection and conservation

e) Carbon Footprint

- Number of persons using cycles – Nil
- Number of persons using cars – 10
- Number of persons uses two wheelers –37
- Number of persons using other transportations –3000
- Number of average visitors per day – 20
- Number of Students staying in the hostel – 860
- Number of Faculty and staff staying in the quarters –5
- Average distance travelled by stake holders – 10x2 kms/day

Noise

Sl. No	Location	Max value in dB	Average Value in dB
1	Near Mother Rose Building Canteen	70.1	59.2
2	Near Wellness Room	74.9	62.6
3	Near Biochemistry Lab	79.8	73.0
4	Near Sports and Games Room	74.4	66.0
5	Near Main Entrance	80.1	66.2
6	Near NCC office (Gate II)	86.0	67.2

Diesel Generators (DG) are not running on continuous basis. Only during power failure, DG sets are operated till power resumes during College working hours

Normally Power failure duration is very short only.

During planned shutdown hours , DGs are being run continuously based on the load Noise disturbance due to DG set is negligible only

All buildings are far away from the National Highway. Noise disturbance from the national highway is not appreciable.

Only the building close to the bridge have little noise impact due to heavy vehicle movements

Noise during train movements are little concerned.

4.2 Evaluation of Audit Findings

Water

54, 000 litres of water is used per day by the college for its different uses. The main source of water is ground water. 36,000 litres of Water is outsourced on college working days.

The quality of Drinking water is within the norms

The chemical parameters like TDS, Hardness etc present in the borewell water and the corporation water (outsourced) are within the norms

Copy of analysis reports are enclosed

If water treatment system is installed at hostel , canteen and chemical laboratories the amount of water lost through outlets can be recycled and utilized for gardening and toilet uses. Awareness programs for the management of sustainable water use will be highly beneficial in this college.

Energy

Electrical Energy consumption in the college

❖ Average Electrical energy consumption in the college is varying between 22,700 and 33,100 units / Month

SL No	Month	Energy consumption
1	September -2019	33,096 units
2	October-2019	27,296 units
3	November-2019	22,685 units
4	February-2020	28,682 units

Electrical Energy consumption in the hostel

Service No 05-041-011-536

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25.10.2019	4,880	26.10.2018	5,070
29.08.2019	5,994	30.08.2018	5,430
27.06.2019	1,590	27.06.2018	1,740
25.04.2019	4,540	27.04.2018	5,770
Total	24,404		25,710
Average/Month	2,034		2,142

Service No 05-041-011-165

Assessment Date	**Energy consumed in units**	**Assessment Date**	**Energy Consumed in units**
27.02.2020	15,400	**27.02.2019**	13,760
26.12.2019	14,780	**27.12.2018**	15,600
25.10.2019	18,220	**26.10.2018**	18,618
29.08.2019	18,630	**30.08.2018**	23,213
27.06.2019	5,850	**27.06.2018**	6,960
25.04.2019	18,890	**27.04.2018**	23,130
Total	91,770		1,01,281
Average /Month	7,648		8,440

Service No 05-041-011-571

Assessment Date	Energy consumed in units	Assessment Date	Energy Consumed in units
26.02.2020	3,010	26.02.2019	3,960
26.12.2019	3,100	27.12.2018	3,230
25.10.2019	3,630	26.10.2018	3,790
29.08.2019	4,110	30.08.2018	4,810
27.06.2019	1,820	27.06.2018	1,930
25.04.2019	4,010	27.04.2018	4,950
Total	19,680		22,670
Average/Month	1,640		1,889

Total Electrical Energy used in the hostel for last year – 1,49,661 units

Average Electrical Energy usage per month in the hostel for last year –12,471 units

Total Electrical Energy used in the hostel for the current year - 1,35,854 units

Average Electrical Energy usage per month in the hostel for the current year - 11,321 units

Present energy saving methods adopted in the college

- Turn off electrical equipment when not in use
- Replace balance CFL bulbs with energy efficient light-emitting diode (LED) bulbs
- Replace old high energy consuming appliances with five star rated energy efficient appliances
- Use computers and electronic equipment in power saving mode.

The total electrical energy utilization by the college and Hostel for different purposes is approximately **33,000 to 44,000 units/month.**

Increased production of solar energy will be a good energy management system for the college.

Energy saving through the replacement of incandescent bulbs, CFL lamps and tube lights to LED light could be a good option.

Energy efficient electrical equipment especially fans and pump sets can be replaced against old ones.

Awareness programs for the stakeholders to save energy may also increase sustainability in the utilization of various energy source.

Waste

Biogas plant capacity to be utilised to the maximum

The composting facility of the college for the treatment of biodegradable waste generated from the canteen, vegetable garden, and from the college campus cleaning operations is not adequate. Different methods such as pit composting, vermi-composting, bacterial composting using bacterial consortium may be used to treat the biodegradable waste.

Bottles, plastics, cans, tins etc., may be recycled.

A model solid waste treatment system can be established in the college as a part of awareness program to the students.

Green Campus

The campus has 88 species of trees. A model arboretum will be ideal for the college. At least 50 different types of trees can be planted in the campus every year.

Area demarcated for the establishment of a gardens of medicinal plants and vegetable garden, the extent of which may be increased.

Carbon Footprint

Burning of fossil fuels is the main source and cause of carbon dioxide release to the atmosphere. It is contributing to the global warming and increasing the pace of climate change.

More trees may be planted in the campus to make a source of sink for the carbon dioxide and for other greenhouse gases.

4.3 Consolidation of Audit Findings

We hope that students will have developed a greater appreciation and understanding of the impact of their actions on the environment. They have successfully been able to determine the impacts on the environment through the various auditing exercises. Participating in this Environmental audit and the Green auditing procedure they have gained knowledge about the need of sustainability of the college campus. It will create awareness on the use of the Earth's resources in their home, college, local community and beyond.

Energy Saving activities implemented

- ADMIN BLOCK all fans are replaced with Energy Efficient Super fans
- ADMIN BLOCK all conventional tube lights are replaced with LED tube lights
- Hostel AMALITTA BLOCK all rooms are provided with Energy Efficient fans
- Hostel AMALITTA BLOCK, MADONA BLOCK, ANNUNCIATA BLOCK MARIETTA BLOCK — All rooms are provided with LED lights
- On Grid Solar Roof Top power plant of 9.9 KW at ADMIN BLOCK
- On Grid Solar Roof Top power plant of 10.24 KW at Hostel MADONA BLOCK
- On Grid Solar Roof Top power plant of 8 KW at Hostel AMALITTA BLOCK
- Off Grid Solar Roof Top power plant of 1.92 KW at Hostel MARIETTA BLOCK
- Solar Water Heater capacity of 150 Litres per Day
- Solar Street Lights -14 Nos

Waste to Wealth

- Bio Gas plant installed at Hostel - Biogas output capacity - 20M^3/ Day
- Bio Gas generation is 1,483 M^3 during audit
- Every month, fuel usage of 6 nos. LPG cylinder quantity got reduced
- Activity of Food waste disposal to outside agency was eliminated
- Selling of Bio Fertilizer made from Bio composting of dry leaves
- Waste papers are converted into useful products

Rain Water Harvest

- Three Rainwater storage pits having capacity of 9000 cuft., 3600 Cuft. and 720 Cuft. are being utilised effectively

Reduction in Water consumption

- Green Chemistry is followed in the Chemical laboratory
- Water consumption got reduced from 1.2 litre per student to 50 ml per student
- Rainwater is used for generation of distilled water to use at laboratory

Reduction in usage of Hazardous chemical

- Most of the Hazardous chemicals are replaced with green chemicals

Waste Recycle

- RO reject water is being used for garden

General

- Gardens inside the college premises are found well maintained.
- Use of notice boards and signs are inadequate to reduce over exploitation of natural resources.
- Programs on green initiatives have to be increased.
- Campus is declared plastic free, stringent actions should be taken to maintain this.
- Rain water harvesting systems, solar power generation, environmental Education programs have to be strengthened.

Water Audit

- There is no water consumption monitoring system in the college campus.
- The college does not have waste water treatment for waste water generated from canteen, hostel kitchen, toilets, bathrooms and office rooms.
- The college has to take actions to maximum rainwater harvesting. Rainwater harvesting for some of the buildings are lacking. Measurement of quantity of water obtained from the rainwater harvesting should be done.
- Display boards against the misuse of water use are lacking.

Energy Audit

- The communication process for awareness in relation to energy conservation is found inadequate.
- Monthly use of electricity(Energy) in the college and hostel to be monitored
- Objectives for reducing energy and water consumption are to be fixed
- Targets to be set for energy & water consumption reduction
- There are some more fans of older generation and non-energy efficient which can be phased out by replacing with new energy efficient fans in phased manner

Waste Audit

- Solid waste management systems established are insufficient.
- The college has proper communication with the local body for regular collection of solid waste from the campus.
- Waste bins in the class rooms, veranda, canteen and campus are inadequate.
- Bio gas plant is not utilised to the full capacity. Only Hostel's food waste and vegetable waste are being utilised in Bio gas plant.
- Composting systems to be enhanced from the current level.

Green Campus Audit

- Tree cover of the college with respect to the stakeholder strength is good
- Regular planting of trees in the campus are to be motivated
- Water uses for gardens are to be measured
- There is only very few fruit trees in the college to attract birds.

Carbon Foot Print Audit

- College has not yet taken any initiative for carbon accounting.
- Pooling of cars shall be initiated among the staffs and students
- Encourage students to use cycles.

4.4 Preparation of Action Plan

Policies referring to college's management and approach's towards the use of resources need to be considered. The college should have a green policy/environmental policy for its sustainable development. The environmental policy formulated by the management of the college should be implemented meticulously

4.5 Follow-up Action and Plans

Environmental audit and Green audit are exercises which generate considerable quantities of valuable management information. The time and effort and cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organisation and that action plans and implementation programs result from the findings. Audit follow-up is part of the wider process of continuous improvement. Without follow-up, the audit becomes an isolated event which soon becomes forgotten in the pressures of organisational priorities and the passing of time.

4.6 Environmental Education

The following environmental education program may be implemented in the college before the next auditing:-

- Training programs in solid waste management, liquid waste management, setting up of medicinal plant nursery, water management, energy management, landscape management, pollution monitoring methods and rainwater harvesting methods.
- Increase the number of display boards on environmental awareness such as – save water, save electricity, no wastage of food/water, switch off light and fan after use, plastic free campus etc.
- Set up model vegetable garden, medicinal plant garden etc. for providing proper training to the students.

Awareness on Carbon Consumption

- Students and Staff members may be made totally aware of pollution caused by use of vehicles.
- The carbon consumption awareness programs on carbon emission at individual as well as social level will help to avoid air and noise pollution in the campus due to vehicles.

4.7 Conclusion and Full List of Recommendations

The Environmental audit and the Green audit assists in the process of testing performance in the environmental arena and is fast becoming an indispensable aid to decision making in a college. The audit reports assist in the process of attaining an eco-friendly approach to the sustainable development of the college. Hope that the results presented in the Environmental audit and the Green auditing report will serve as a guide for educating the college community on the existing environment related practices and resource usage at the college as well as spawn new activities and innovative practices.

A few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus sustainable environment and community development. It has been shown frequently that the practical suggestions, alternatives, and observations that have resulted from audits have added positive value to the audited organisation. An outside view, perspective and opinion often helps staff who have been too close to problems or methods to see the value of alternative approaches. A Environmental audit and the Green audit report is a very powerful and valuable communications tool to use when working with various stakeholders who need to be convinced that things are running smoothly and systems and procedures are coping with natural changes and modifications that occur.

Common Recommendations

- ❖ Adopt an environmental policy, objectives & Targets for the college
- ❖ Establish a purchase policy for environmental friendly materials
- ❖ Conduct more seminars and group discussions on environmental education
- ❖ Students and staff can be permitted to solve local environmental problems
- ❖ Establish water, waste and energy management systems

Criteria Wise Recommendations

Water

- Install water flow meter to measure the consumption of water
- Drip irrigation system for gardens shall be planned
- Establish rainwater harvesting systems for left over building.
- Establish waste water treatment systems and reuse the water for gardening
- More Awareness programs on water conservation to be conducted.
- Install display boards to control over exploitation of water.

Energy

- Installation of more solar power plants and other renewable energy sources.
- Conduct more awareness programs on importance of energy saving for students and staff.
- More energy efficient fans to be used.
- Observe a power saving day every year.
- Automatic power switch off systems may be introduced.

Waste

- A model solid waste treatment system to be established.
- Practice of waste segregation to be improved.

Green Campus

- Create more space for planting.
- Create automatic drip irrigation system.
- Not just celebrating environment day but making it a daily habit.
- Encourage students for making the campus green
- Installation of Bird feed and bird bath
- Bottle garden to be maintained properly

Carbon footprint

- Establish a system of car-pooling among the staff to reduce the number of four wheelers coming to the college.
- Encourage students and staff to use cycles.
- Discourage the students using two wheelers for their commutation.
- Study carbon levels within and outside the college

Criterion : VII – Institutional Values and Best Practices

Metric : 7.1.6 – Quality audits on environment and energy

Year : 2015 - 2020

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TEST REPORT

WATER ANALYSIS

Report No :	EL-NO-WR-94A-03-2020	**Report Date :**	14.03.2020
Customer Name & Address		**Sample Reference No :**	EL-NO-WR-94A-03-2020
		Sample Description :	Water
M/s. Fatima College Dindigul Road, Madurai - 625001.		**Sample Drawn By :**	Customer
		Sample Collected Date :	09.03.2020
		Qty of Sample Received :	1 Liter (Approximately)
		Sample Received On :	10.03.2020
		Test Commenced On :	10.03.2020
		Test Completed On :	14.03.2020
		Sampling Method :	--
		Sample Mark:	Corporation Water

S.No	Name of the Test	Test Method	Units	Results
1.	Calcium (as Ca)	IS 3025 (Part 40) : 1991 (Reaffirmed 2019) Clause No.5	mg/L	30
2.	Chlorides (as Cl)	IS : 3025 (Part 32) : 1988 (Reaffirmed 2019) Clause No.2	mg/L	35
3.	Magnesium (as Mg)	IS 3025 (Part 46) : 1994 (Reaffirmed 2019) Clause No.6	mg/L	23
4.	pH value @ 25°C	IS : 3025 (Part 11) : 1983 (Reaffirmed 2017) Clause No.2	No.	7.0
5.	Total Dissolved Solids @ 105°C	IS 3025 (Part 16) : 1984 (Reaffirmed 2017)	mg/L	276
6.	Total Hardness (as $CaCO_3$)	IS 3025 (Part 21) : 2009 (Reaffirmed 2019) Clause No.5	mg/L	171
7.	Turbidity	IS : 3025 (Part 10) : 1984 (Reaffirmed 2017)	NTU	<0.1

<--- End of Report --->

Notes :
--

Report Confirmed By :

R.REVATHI
Technical Manager

For EXCELLENCE LABORATORY

Authorized Signatory

R.S.DINAKARAN
Quality Manager

Excellence Laboratory ★Madurai-625016★

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3. The test results does not account the MU value in the statement of conformity unless or otherwise specified in the report.
4. The laboratory is not responsible for information provided by customer and it does not come under the scope of accreditation.
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ISO

TEST REPORT

WATER ANALYSIS

Report No :	EL-NO-WR-95A-03-2020	**Report Date :**	14.03.2020
Customer Name & Address		**Sample Reference No :**	EL-NO-WR-95A-03-2020
M/s. Fatima College Dindigul Road, Madurai - 625001.		**Sample Description :**	Water
		Sample Drawn By :	Customer
		Sample Collected Date :	09.03.2020
		Qty of Sample Received :	1 Liter (Approximately)
		Sample Received On :	10.03.2020
		Test Commenced On :	10.03.2020
		Test Completed On :	14.03.2020
		Sampling Method :	--
		Sample Mark:	Bore Water

S.No	Name of the Test	Test Method	Units	Results	Max. Permissible Limits of IS:10500:2012
1.	Calcium (as Ca)	IS 3025 (Part 40) : 1991 (Reaffirmed 2019) Clause No.5	mg/L	19	200
2.	Chlorides (as Cl)	IS : 3025 (Part 32) : 1988 (Reaffirmed 2019) Clause No.2	mg/L	420	1000
3.	Magnesium (as Mg)	IS 3025 (Part 46) : 1994 (Reaffirmed 2019) Clause No.6	mg/L	14	100
4.	pH value @ 25°C	IS : 3025 (Part 11) : 1983 (Reaffirmed 2017) Clause No.2	No.	7.2	6.5 - 8.5
5.	Total Dissolved Solids @ 105°C	IS 3025 (Part 16) : 1984 (Reaffirmed 2017)	mg/L	1320	2000
6.	Total Hardness (as $CaCO_3$)	IS 3025 (Part 21) : 2009 (Reaffirmed 2019) Clause No.5	mg/L	133	600
7.	Turbidity	IS : 3025 (Part 10) : 1984 (Reaffirmed 2017)	NTU	<0.1	5.0

<--- End of Report --->

Notes:
The concentration of the parameters tested in the above sample is within the prescribed permissible limits of potable drinking water quality standard of **IS: 10500: 2012 tolerance limits.**

Report Confirmed By :

R.REVATHI
Technical Manager

For EXCELLENCE LABORATORY

Authorized Signatory

R.S.DINAKARAN
Quality Manager

Excellence Laboratory * Madurai-625016 *

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TEST REPORT

WATER ANALYSIS

Report No :	EL-NO-WR-96A-03-2020	Report Date :	14.03.2020
Customer Name & Address		Sample Reference No :	EL-NO-WR-96A-03-2020
M/s. Fatima College Dindigul Road, Madurai - 625001.		Sample Description :	Water
		Sample Drawn By :	Customer
		Sample Collected Date :	09.03.2020
		Qty of Sample Received :	2 Liter (Approximately)
		Sample Received On :	10.03.2020
		Test Commenced On :	10.03.2020
		Test Completed On :	14.03.2020
		Sampling Method :	--
		Sample Mark:	RO Water

S.No	Name of the Test	Test Method	Units	Results	Max. Acceptance Limits of IS:10500:2012
Chemical Parameters:					
1.	Calcium (as Ca)	IS 3025 (Part 40) : 1991 (Reaffirmed 2019) Clause No.5	mg/L	<1.0	75
2.	Chlorides (as Cl)	IS : 3025 (Part 32) : 1988 (Reaffirmed 2019) Clause No.2	mg/L	6.5	250
3.	Copper (as Cu)	IS 3025 (Part 42) : 1992 (Reaffirmed 2019) Clause No.6	mg/L	<0.02	0.05
4.	Fluoride (as F)	APHA 23rd Edition 2017 (4500 - F D)	mg/L	<0.1	1.0
5.	Iron (as Fe)	IS 3025 (Part 53) : 2003 (Reaffirmed 2019) Clause No.7	mg/L	<0.05	1.0
6.	Magnesium (as Mg)	IS 3025 (Part 46) : 1994 (Reaffirmed 2019) Clause No.6	mg/L	<1.0	30
7.	pH value @ 25°C	IS : 3025 (Part 11) : 1983 (Reaffirmed 2017) Clause No.2	No.	6.5	6.5 - 8.5
8.	Sulphates (as SO_4).	IS : 3025 (Part 24) : 1986 (Reaffirmed 2019) Clause No.2	mg/L	<5.0	NA
9.	Total Alkalinity (as $CaCO_3$)	IS : 3025 (Part 23) : 1986 (Reaffirmed 2019)	mg/L	5.1	200
10.	Total Dissolved Solids @ 105°C	IS 3025 (Part 16) : 1984 (Reaffirmed 2019)	mg/L	9.1	500

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TEST REPORT

Report No : EL-NO-WR-96-05-2020					
11.	Total Hardness (as $CaCO_3$)	IS 3025 (Part 21) : 2009 (Reaffirmed 2019) Clause No.5	mg/L	<1.0	200
12.	Turbidity	IS : 3025 (Part 10) : 1984 (Reaffirmed 2017)	NTU	<0.1	1.0
13.	Zinc (as Zn)	IS 3025 (Part 49) : 1994 (Reaffirmed 2019) Clause No.6	mg/L	<0.05	5.0
Microbiological Parameters:					
14.	Coliform Bacteria (in 100 mL)	IS 15185 : 2016	Present/ Absent	Absent	Absent
15.	Escherichia coli (in 100 mL)	IS 15185 : 2016	Present/ Absent	Absent	Absent

<--- End of Report --->

Notes:
The concentration of the parameters tested in the above sample is within the prescribed acceptance limits of potable drinking water quality standard of **IS: 10500: 2012 tolerance limits.**

Report Confirmed By :

Laalthi

For EXCELLENCE LABORATORY

Authorized Signatory

R.S.DINAKARAN
Quality Manager

Excellence Laboratory * Madurai-625016 *

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