

A.I.S.S.M.S.'S.
INSTITUTE OF INFORMATION TECHNOLOGY
PUNE.
Inward No. 3888
Date 8/2/2022

AISSMS
College of Pharmacy
Pune 1
Inward No 116-2
Date 30.03.2022

To,
The Principal
Institute of Information Technology
AISSMS
Kennedy Road,
Near R. T. O.
Pune - 411001


(Contact:- Dr. Yogesh Patil/IoT - 9421051726)
Mr. Mahajan sir - 965-
9673819706

From,
HEAD

Department of Environmental Science
S P PUNE UNIVERSITY

AISSMS Cop Contact
- Dr. Sanjosh Gaudli - 9689932181
Dr. Y. P. Patil
Vijay




Principal
AISSMS College of Pharmacy
Pune-1



Savitribai Phule Pune University

(formerly University of Pune)

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DEPARTMENT OF ENVIRONMENTAL SCIENCE
Dr.Nanasaheb Parulekar Paryavaran Bhavan
Savitribai Phule Pune University, Pune- 411007, India

Ref.No. EVS. Sc./ 2022 / 39

Date: 04/02/2022

To,
The Principal
Institute of Information Technology
AISSMS
Kennedy Road,
Near R. T. O.
Pune - 411001

Submission of Environmental and Green Audit Report of AISSMS - IOIT campus

Dear Dr. Mane,

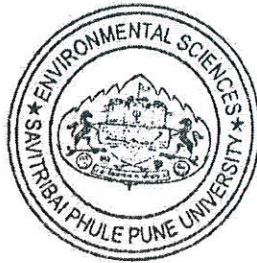
This is with reference to the subject; we hereby submit final Environmental and Green Audit Report of AISSMS - IOIT campus in soft format and hard format.

Regards,

Dr. Suresh Gosavi

Professor & Head
HEAD

Department of Environmental Sciences
Savitribai Phule Pune University
Pune - 411 007.



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Environmental and Green Audit Report of
All India Shri Shivaji Memorial Society (AISSMS) Campus
Kennedy Road, Near R. T. O., Pune

Ambeyan

By

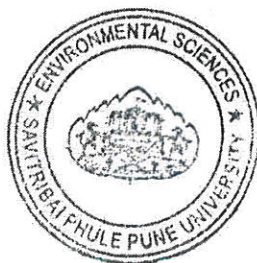
Department of Environmental Science,
S. P. Pune University

HEAD Pune
Department of Environmental Sciences
Savitribai Phule Pune University
Pune - 411 007.

Coordinated by:
Dr. Yogesh P. Patil
Associate Professor
AISSMS IOIT, Pune

Mr. Prashant G. Mahajan
Assistant Professor
AISSMS IOIT, Pune

October 2021



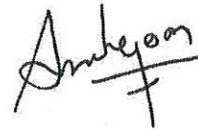
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Prashant G. Mahajan

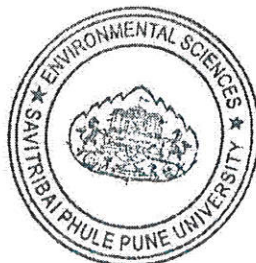
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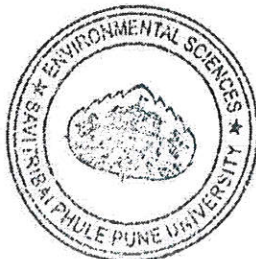
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Abbreviations

AISSMS	All India Shri Shivaji Memorial Society
COE	College of Engineering
COP	College of Pharmacy
IOM	Institute of Management
IOIT	Institute of Information Technology
DoES	The department of Environmental Science
SDGs	Sustainable Development Goals
NBC	National Building Code
PMC	Pune Municipal Corporation
RWH	Rain Water Harvesting
dB	Decibels
RTO	Regional Transport Office
WHO	World Health Organization
MSWM	Municipal Solid Waste Management
PV	Photovoltaic
KW	Kilo Watt
ETP	Effluent Treatment Plant
MPCB	Maharashtra Pollution Control Board
PUC	Pollution Under Control
NSS	National Service Scheme



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1. Background

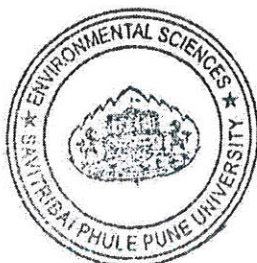
All India Shri Shivaji Memorial Society (AISSMS) was established in 1917 by late Shri Shrimant Chattrapati Shahu Maharaj of Kolhapur and H.H. Late Alija Bahadur Madhavrao Scindia Maharaj of Gwalior. It was established with well defined objective to bring about all round development of students and to create technically skilled manpower in the various fields.

The Society started a day school and junior college in 1972. To keep up with the changing times, in 1992, All India Shri Shivaji Memorial Society made a foray into higher and technical education. Today besides running residential and Day schools and Junior Colleges ranging from vocational to other disciplines, AISSMS runs world class ITI which has collaborated with Germany to impart vocational training, Polytechnic in two shifts, Hotel Management and Catering Technology, Pharmacy, Engineering Colleges with a wide spectrum of disciplines, and Management College in two shifts as well.


All the colleges except Polytechnic run under-graduate as well as Masters Programmes in various disciplines all affiliated to the Prestigious Savitribai Phule Pune University (previously University of Pune). AISSMS colleges have obtained accreditation from the National Board of Assessment and Accreditation Council (NAAC), National Board of Accreditation (NBA) and also have signed MOU's with Universities from the UK, the USA and Germany to run joint programmes of global standards. The Corporates, academicians, industrialists and the student community have lauded the efforts made by the All India Shri Shivaji Memorial Society to take the society to un-scaled heights.

Campus institutes

1. College of Engineering (COE)
2. College of Pharmacy (COP)
3. Institute of Management (IOM)
4. Institute of Information Technology (IOIT)
5. Polytechnic College
6. Day School
7. Primary school



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2. Scope of Work

The department of Environmental Science (DoES), S. P. Pune University has strong network of experts in the field of Environment. With the previous experience of DoES in the field of environmental assessment, the management of AISSMS initiated the discussion and process of environmental audit with DoES. The management approached DoES with this initiative, where the AISSMS and DoES agreed to undertake environmental assessment of the following environmental issues for the above-mentioned campus areas.

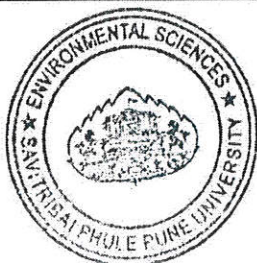
1. Water Supply and Sewerage
2. Plant diversity of the Campus
3. Noise Monitoring of the Selected locations within the campus
4. Solid Waste Management Practices within the campus.
5. Air Quality Monitoring

Based on the available data, sampling and information provided by the AISSMS officials this report has been prepared and recommendations for betterment of campus environment are provided.


3. Baseline Data

It was observed that some of the campus part was handed over to the local government for the purposes of construction of Metro-line (adjoining existing DP road to the South of the campus) and Road (adjoining Sudarshan chemicals to the West of the campus). Due to this infrastructure development many of the trees adjoining to these fence areas have been lost and noise levels may rise during construction.

The most of the baseline data relating population, water supply, solid waste generation has been collected partially from the AISSMS management, where the samples for drinking water, noise, plant diversity were collected by visiting the campus area by the expert teams.



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Table No. 1: Total Population of the campus

Sr. No.	Department	Total population of institute (incl. Students, Permanent, Temporary staff and visitors)
1	College of Pharmacy	532
2	College of Engineering	3186
3	Day school	1577
4	Polytechnic College	1465
5	Institute of Information Technology	2608
6	Institute of Management	390
7	Primary school	895
	Total	10,653

4. Environmental Issues

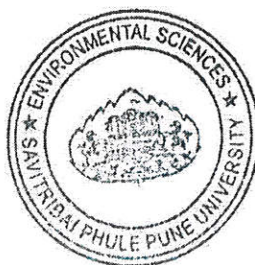
4.1 Water Supply and Sewerage

Water is a key driver and is vital to development of Biodiversity, Agriculture, Humans as well as the economy. With recent experiences across the world and in India, the water scarcity and security are emerging as a global risk. The state of Maharashtra has also faced severe impact of the water scarcity in the recent past. Therefore, water management is a crucial step of sustainable development and it also has been made an integral part of the Sustainable Development Goals (SDGs).

Unplanned urban growth and economic development has placed unprecedented pressures natural resources especially on water. The world-bank estimates " that with the business as usual, global water crises may rise multiple folds due to a shortfall of about 40% between the demand and available supply of water by 2030. This brief background highlights the necessity of the overall water management.

4.1.1 Water supply on the campus

There are about 25 water storage tanks within the campus. The capacities are shown in Table No. 2.



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Table No. 02: Water Storage Capacity at the campus

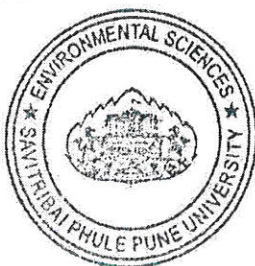
Sr. No.	Type of water storage	No. of units	Total Capacity (m ³ /day)
1	Underground Tanks	7	252.82
2	Overhead Tanks	18	311.41
	Total	25	564.23

Table No. 03: Water supply requirements as per National Building Code, 2016 (Water Supply for Buildings Other than Residences)

Sr. No.	Department	Total population of institute (incl. Students, Permanent, Temporary staff and visitors)	Water requirement (m ³ /day)
1	College of Pharmacy	532	23.94
2	College of Engineering	3186	143.37
3	Day school	1577	70.97
4	Polytechnic College	1465	65.93
5	Institute of Information Technology	2608	117.36
6	Institute of Management (MBA)	390	17.55
7	Primary school	895	40.28
	Total	10,653	479.39

Note: This requirement is inclusive of drinking water.

Based on the available data and benchmarking for water supply as per National Building Code (NBC), it can be seen that the campus has about 84.84 m³ of excess fresh water storage. Considering that about 80% of the water supplied is converted in to the waste water, the campus generated about 384 m³ of waste water every day.



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4.1.2 Water quality on the campus

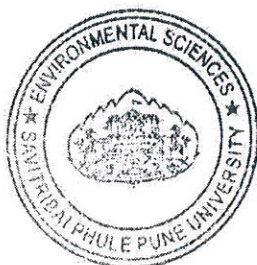
4.1.2.1 Laboratory procedures

After sampling, collected samples were immediately brought to analytical laboratory and kept in refrigerator at temperature below 40°C and further analysis started without delay based on the priority to analyze parameters as prescribed by APHA (1995) methods. Various physico-chemical parameters analysed for water sample include pH (Digital pH meter DPH504), Electrical conductivity (EC) (Digital EC meter DEM900). Total Hardness (TH), Residual Chlorine, was estimated by standard titrimetry.

A) Physico - Chemical analysis of Ground water and Surface water:

All parameters were determined in the laboratory by following the Standard protocols (APHA, 1995). The samples were analyzed in order to evaluate 10 parameters as follows:

- pH
- EC
- Total Alkalinity (TA) As HCO_3^-
- TSS
- TDS
- Residual Chlorine
- BOD
- COD
- Residual Chlorine



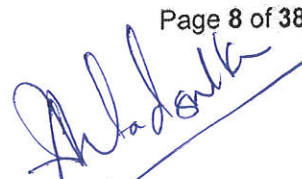
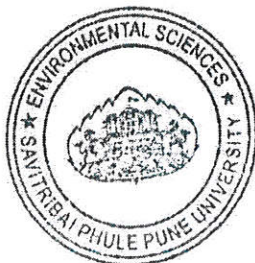
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Table No. 04: Drinking water quality in the campus

Sr. No.	Parameters	Method of Analysis	Day School First floor	IOIT Overhead	Polytechnique Overhead	Engineering College (2nd Floor)	Pharmacy (Ground Floor)	Primary School	Drinking water standards as per IS 10500:2012-acceptable limits
1	pH	pH meter	7.4	7.9	7.4	7.5	7.6	7.5	6.5-8.5
2	Electrical Conductivity (Mho/cm)	EC meter	1.45	2.33	2.36	1.96	2.14	1.64	---
3	TSS (mg/l)	Filtration Method	0.65	2.68	2.16	0.89	0.73	0.75	---
4	TDS (mg/l)	Evaporation Method	2.1	3.45	3.56	2.73	0.76	4.5	500
5	BOD (mg/l)	Winkler's Iodometric method	Nil	Nil	Nil	Nil	Nil	Nil	---
6	COD (mg/l)	Reflux Digestion Method	Nil	Nil	Nil	Nil	Nil	Nil	---
7	Residual Chlorine (mg/l)	Sodium Thiosulphate Titration Method	Nil	Nil	Nil	Nil	Nil	Nil	0.2



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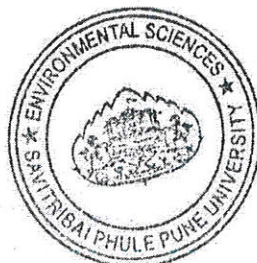
8	Chlorides (mg/l)	Silver Sulphate Method	20.45	30.78	36.25	17.36	14.63	35.64	250
9	Total Hardness (mg/l)	EDTA Titration Method	85	91	75	56	78	69	200
10	Total Alkalinity (mg/l)	Titration Method	36	45	49	46	37	55	200

Note:

1. All result values are in mg/l, except pH and EC.
2. These results are not reproducible; the results are subject to water storage and supply conditions on the site.

Conclusion

On the basis of analysis carried out in our laboratory, it is interpreted that all samples are within acceptable limit of WHO standards. As all water is supplied by PMC to campus, quality of water is suitable for drinking purpose. The parameters like BOD, COD and Residual Chlorine is Nil, indicates very good quality of water.



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4.1.3 Sewerage Management

Most of the waste water generates from the toilet facility.

Table No. 5 - number of toilets and urinals available

Sr. No.	Department	No. of Toilet Blocks - Staff	No. of Toilet Blocks - Students	Total no. of Toilet Blocks	No. of Toilet Seats - conventional	Total no. of urinals - Boys	Total no. of urinals - Girls (western)
1	College of Pharmacy	3	8	11	23	17	22
2	College of Engineering	7	8	15	57	23	30
3	AISSMS - Day school	5	10	15	35	23	30
4	Polytechnic college	4	10	14	45	21	28
5	Institute of Information Technology	17	13	30	79	45	60
6	Institute of Management (MBA)	9	8	17	49	26	34
7	Primary school	1	2	3	9	5	6
	Total	46	59	105	297	160	210

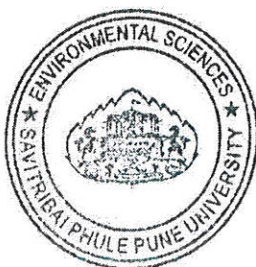
Note:

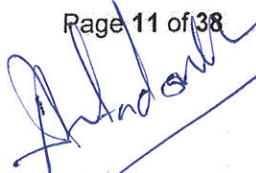
1. It is assumed that at least 2 toilet seats area are available per toilet block; and urinals for females are of western type
 2. It is assumed that 50 % of the toilet blocks are for females (student and staff) and 50% of the toilet blocks are for males (student and staff)
 3. It is assumed that each of the Boy's toilet block has at least 3 urinals whereas Girl's toilet block has a provision of at least 2 western urinals i.e. commode.
- The quantum of waste water is high and can be converted in to a resource by treating this waste water.
 - No separate facility to treat the liquid chemical waste generated within the campus.

4.1.4 Rain Water Harvesting

Water scarcity is a grave problem for mankind. More and more water is needed for domestic, construction, and industrial use – and the rate of extraction is far more than the rate of recharging our water tables.

Overexploitation of groundwater has been a result of urbanization, a decrease in open soil surface and water infiltration rate, and a resultant worsening in water quality. Industrial



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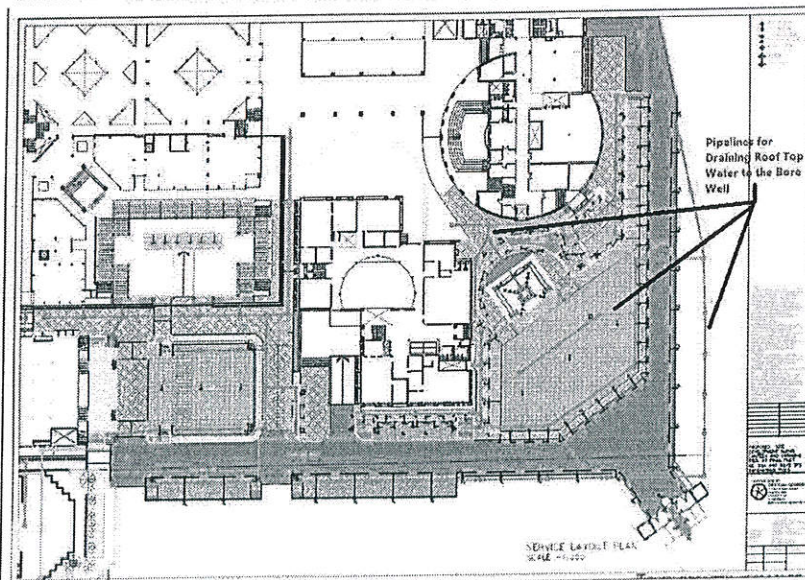
units and residential apartments face acute water shortages, consequence of this shortage comes in the form of elevated amounts of money spent on purchasing water from government and private water suppliers and the rural scenario is no good. An increasing population increases the burden of food production which in turn demands more land, more fertilizers and more water.

Rainwater harvesting (RWH) is a simple method by which rainfall is collected for future usage. The collected rainwater may be stored, utilised in different ways or directly used for recharge purposes. With depleting groundwater levels and fluctuating climate conditions, RWH can go a long way to help mitigate these effects. Capturing the rainwater can help recharge local aquifers, reduce urban flooding and most importantly ensure water availability in water-scarce zones.

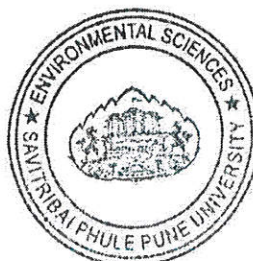
As suggested during previous Environmental Audit, AISSMS has partly implemented Rain Water Harvesting (RWH) (Table no. 6) by recharging about 54 m³ of rain water. It is further suggested that, as the campus includes large paved and unpaved areas along with large terrace areas; this RWH can further be expanded.

Table No.6 – Rain Water Harvesting

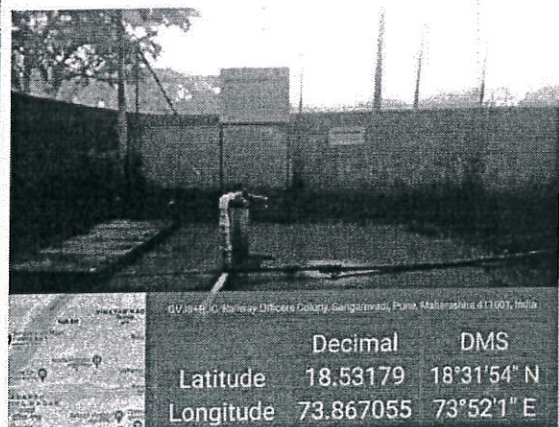
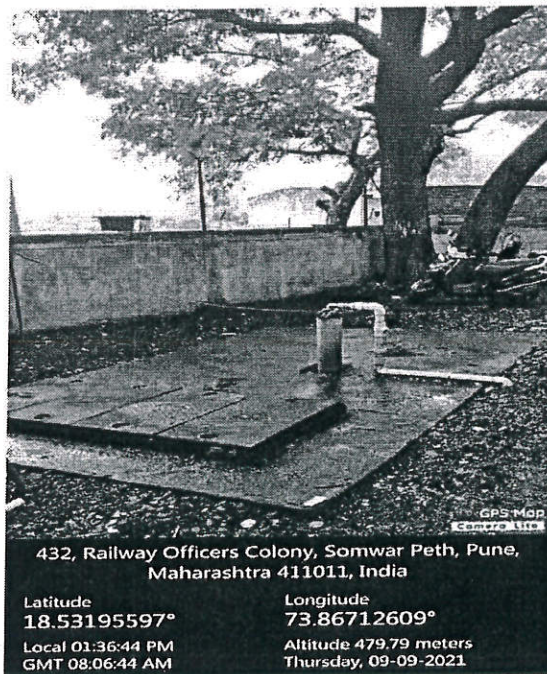
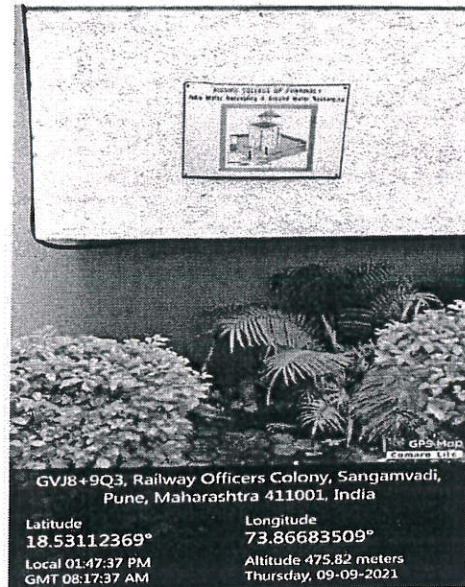
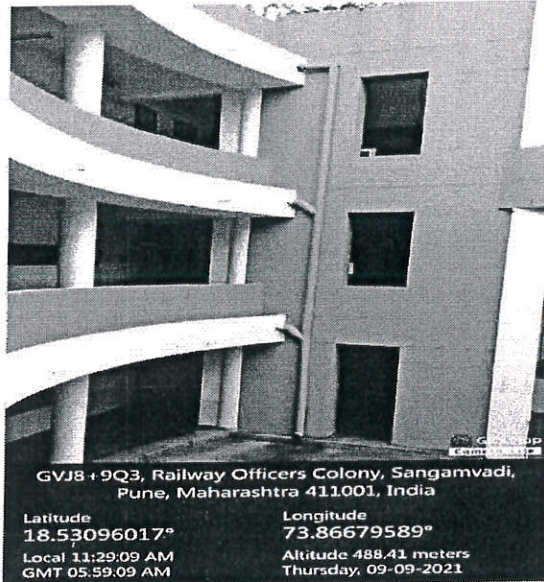
No. of recharge wells	Capacity (m ³)	Total Capacity (m ³)
2	27 m ³ capacity each with 300 feet depth	54



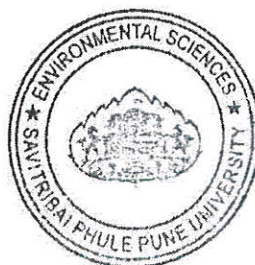
**AISSMS
CAMPUS
LAYOUT**



Rain water harvesting system was incorporated in the architecture plan and has been installed in the college building right from its inception. The water from rooftops and floors is collected through down pipes and discharged in the ground as well as in recharge pits near bore-well through pipe lines in the campus.



Well Recharge



4.2 Noise Environment

Noise pollution is one of the major environmental issues in India today and most of us are unaware of the hazards it can cause. In India, we all are subjected to some form of loud noises for a considerable amount of time on daily basis as well across the year based on the festive season such as Ganesh Festival, Diwali and others.

Unwarranted sounds such as honking, other vehicular noise, the loudspeakers and not to forget about household noise such as television and music system sounds on daily basis are inevitable. In our country it's a major perception that happiness can only be expressed by creating loud noises.

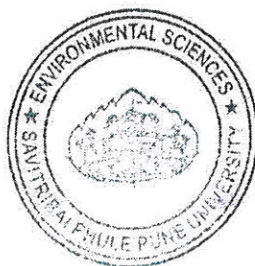
Exposure to high levels of noise may cause permanent hearing loss. The repeated exposures to loud noise can lead to permanent tinnitus and/or hearing loss. Furthermore, it may create physical and psychological stress, reduce productivity, and interfere with communication and concentration. The effects of noise induced hearing loss can be profound, limiting your ability to hear high frequency sounds, understand speech, and seriously impairing your ability to communicate.

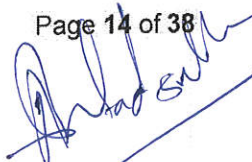
Table No. 7: Health Hazards of Noise on the Human Body

Sr. No.	Noise Levels in dB	Health Hazards
1	80	Annoying
2	90	Hearing Damage
3	95	Very Annoying
4	110	Stimulation of Skin
5	120	Pain Threshold
6	130 – 135	Dizziness, Vomiting
7	140	Pain in Ear
8	150	Significant change in Heart Pulse

Site Location

AISSMS society, Kennedy Road Campus comprises schools and private college affiliated to Savitribai Phule Pune University is located in Pune, Maharashtra. Entire campus is spread over the 11 acres of land and it is situated adjacent to the Pune Railway Station



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and Shivajinagar RTO office which is influenced by the constant traffic inflow. Recent, Pune Metro Development works is underway parallel to the college boundary.

Image No.01: Noise Monitoring Locations

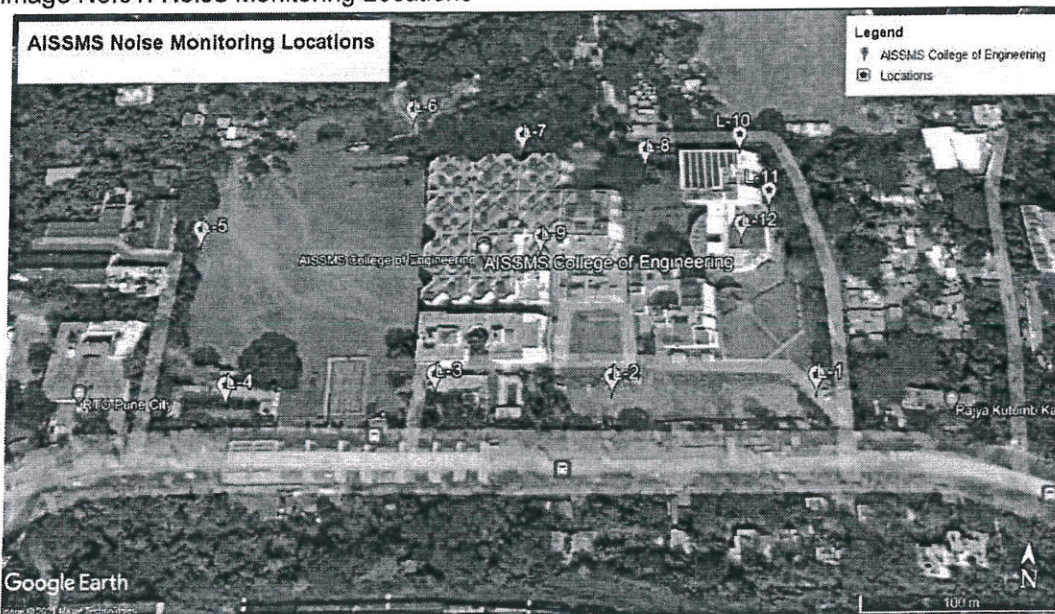
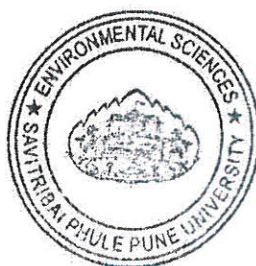


Table No. 8: Noise Monitoring Locations

Sr. No.	Location	Distance from the Kennedy Road boundary walls in meters
1	Main Gate	10
2	Parking Facing Kennedy Road	10
3	Back Gate Near Canteen	10
4	Near Primary School	10
5	Near Sudarshan Chemicals Compound	100
6	Compound Corner Near Biomedical Waste Plant Entrance	150
7	Horse Stable	100
8	Animal House Gate	150
9	CoE Podium	100



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10	IOIT Classroom 213	150
11	IOIT Right Side Entrance	150
12	IOIT Admin Office	150

Noise monitoring methodology adopted for present study

1. The station was located at the ambient level i.e. away from the direct source, away from any vibration and any obstruction.
2. The area with land use pattern is in commercial zone of Development Plan of Pune city.

Monitoring time

Daytime monitoring method was adopted for this location as the it comes under Silent zone and is located in development and commercial zone where daytime working hours are being observed.

Monitoring Methodology:

The following criteria will be observed when undertaking the noise monitoring directed by Central Pollution Control Board, Delhi.

- a) During ambient noise monitoring sound comes from more than one direction, it is important to choose a microphone and mounting which gives the best possible Omni directional characteristics.
- b) The noise measurement equipment was supervised continuously during the monitoring period and notes will be made of the date, time and prevailing weather conditions.
- c) Immediately prior to and following each noise measurement session the accuracy of the noise level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency.
- d) Noise measurements should not have been done during fog and rains.

Table No. 9: Ambient Air Quality Standards in respect of Noise

Area Code	Category of Area / Zone	Limits in dB (A) Leq	
		Day Time	Night Time
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45
D	Silent	50	40

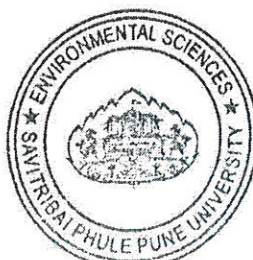
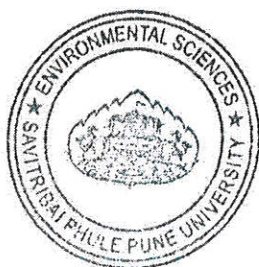
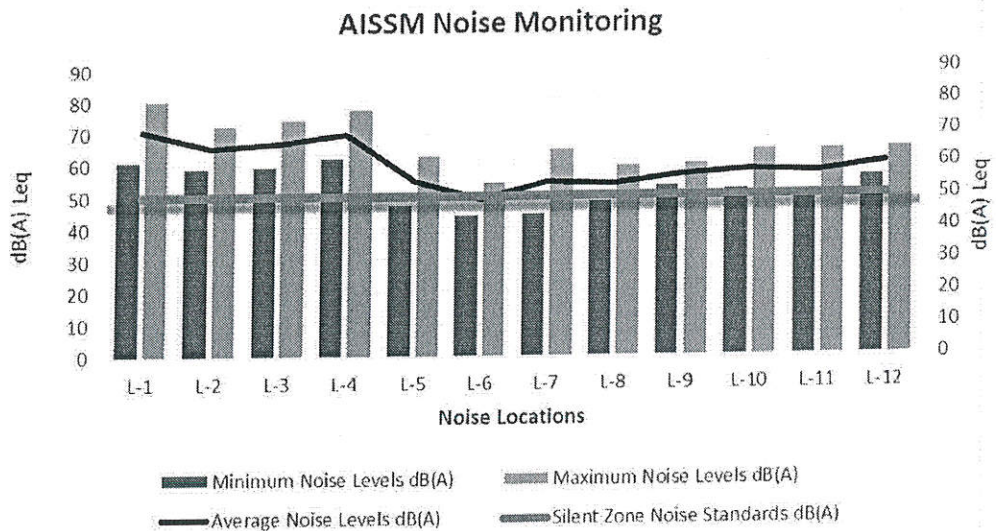


Table No. 10: Noise Monitoring Results

Sr. No.	Location	Minimum Noise Levels dB (A)	Maximum Noise Levels dB (A)	Average Noise Levels dB(A)	Ambient Air Quality Standards in respect of Noise dB (A), in accordance with Noise Pollution (Regulation and Control) amendment rules, 2000 <u>Silent Zone</u>
1	Main Gate	60.9	80.3	70.6	50
2	Parking Facing Kennedy Road	58.7	72.3	65.5	50
3	Back Gate Near Canteen	59.4	74.2	66.8	50
4	Near Primary School	62.0	77.3	69.65	50
5	Near Sudarshan Chemicals Compound	47.0	62.7	54.85	50
6	Compound Corner Near Biomedical Waste Plant Entrance	44.0	54.1	49.05	50
7	Horse Stable	44.4	64.6	54.5	50
8	Animal House Gate	48.3	59.4	53.85	50
9	CoE Podium	52.7	60.1	56.4	50
10	IOIT Classroom 213	51.6	64.1	57.85	50
11	IOIT Right Side Entrance	50.3	64.3	57.3	50
12	IOIT Admin Office	55.6	64.7	60.15	50



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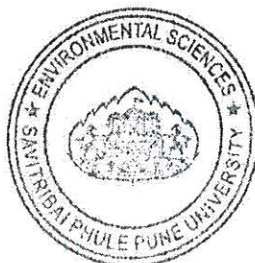
All the locations of the premises are exceeding noise levels from the prescribed permissible limits for Silent zone. As the study location is situated near the main road, the continuous flow of traffic and ongoing Pune Metro Development project activities has contributed significantly towards higher noise levels in these locations.

However, the average noise levels at the location 6 (Compound Corner near Biomedical Waste Plant Entrance) are marginally within the limits as this location is away from the noise sources viz. road traffic and metro construction site. As well as this location is at the rear side of campus.

From the above results, it is clear that the equivalent day noise level at the AISSMS Society Kennedy Road Campus are above the prescribed limit of noise pollution rules 2000 except location 6.

4.3 Plant diversity:

Various man-made activities have wide range of impacts on the surrounding ecosphere, both negative and positive. AISSMS campus (Kennedy rd.) expresses its commitment to sustainability in many ways. The college undertakes various activities like plantation and beautification of campus through National Service Scheme (NSS). The campus has good plantations along with well-maintained medicinal plants' garden; and landscaping. It's a



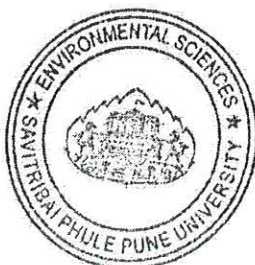
positive step to reduce its environmental impact. This section provides a detailed list of plant species observed within the campus.

The college attempts to maintain ecofriendly atmosphere on the campus; and number and variety of plant species helps to maintain eco-friendly ambience. Further, to create eco-friendly awareness among the students, college arranges special programs through which the students get clear idea and importance of trees in life. In all 99 perennial plant species have been listed (Table 11); whereas total numbers of small trees were 176; medium sized – 114; and large 160 trees. This shows a significant increase than that of previous plant diversity assessment in 2015 (57 perennial plant species with a total number of 75 small trees were; 37 medium sized and 89 large trees). The biodegradable waste was utilized for composting.

The trees like *Polyalthea longifolia*, *Peltophorum pterocarpum*, *Pithecelobium dulce*, *Azadirachta indica*, and *Delonix regia* were most abundant; whereas few species like *Adenanthera pavonia*, *Butea monosperma*, *Cassia fistula*, and *Semecarpus anacardium* are very few. Though, the college campus represents good plant diversity, there is large scope to plant more trees. We have reported major threat to plants along the main road. This was due the road expansion for Metro in Pune city. Along the vicinity of main road high to very high traffic was noticed.

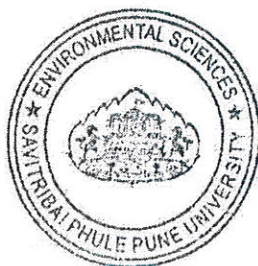
Table No. 11: List of Plant species planted in the campus

Botanical Name	Local Name	Habit	Family	Size and Number		
				L	M	S
<i>Acacia auriculiformis</i>	Australian acacia	Tree	Mimosaceae	1	0	0
<i>Acacia nilotica</i>	Babhul	Tree	Mimosaceae	3	0	0
<i>Adenanthera pavonina</i>	Red Bead Tree	Tree	Mimosaceae	1	0	0
<i>Aegle marmelos</i>	Bel	Tree	Rutaceae	0	0	1
<i>Albizia saman</i>	Rain tree	Tree	Mimosaceae	3	1	2
<i>Alpinia galangal</i>	Alpinia	Herb	Zingiberaceae	0	0	1
<i>Alstonia scholaris</i>	Saptaparni	Tree	Apocynaceae	0	0	8

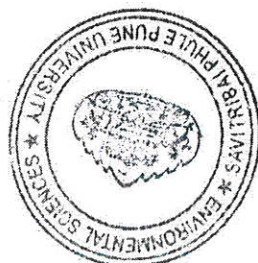


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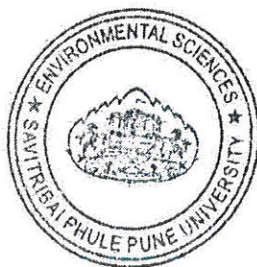
<i>Annona squamosa</i>	Sitaphal	Shrub	Annonaceae	0	0	9
<i>Araucaria columnaris</i>	Christmas tree	Tree	Araucariaceae	1	0	0
<i>Areca catechu</i>	Areca nut	Palm	Arecaceae	0	2	0
<i>Asparagus racemosus</i>	Shatawari	Climber	Asparagaceae	0	0	4
<i>Azadirachta indica</i>	Neem	Tree	Meliaceae	15	2	4
<i>Bauhinia racemosa</i>	Aapata	Tree	Caesalpiniaceae	0	1	0
<i>Bauhinia variegata</i>	Kanchan	Tree	Caesalpiniaceae	0	0	2
<i>Bixa Orellana</i>	Shendri	Tree	Bixaceae	0	1	1
<i>Broussonetia papyrifera</i>	Paper mulberry	Tree	Moraceae	1	3	1
<i>Butea monosperma</i>	Palas	Tree	Fabaceae	1	0	0
<i>Callistemon lanceolatus</i>	Bottle brush	Tree	Myrtaceae	0	1	0
<i>Canna indica</i>	Canna	Herb	Cannaceae	0	0	2
<i>Cardamomum sp</i>	Veldode	Herb	Zingiberaceae	0	0	1
<i>Carica papaya</i>	Papai	Shrub	Caricaceae	2	0	1
<i>Cassia fistula</i>	Amaltash	Tree	Caesalpiniaceae	0	2	3
<i>Cassia grandis</i>	Coral Shower Tree	Tree	Caesalpiniaceae	4	1	0
<i>Cassia siamea</i>	Kasod	Tree	Caesalpiniaceae	3	2	1
<i>Ceiba pentandra</i>	Kapok	Tree	Malvaceae	3	0	1
<i>Citrus lemon</i>	Limbu	Shrub	Rutaceae	0	1	0
<i>Clematis gauriana</i>	Morvel	Climber	Ranunculaceae	0	0	1
<i>Cocos nucifera</i>	Coconut	Palm	Arecaceae	10	2	1
<i>Codiaeum variegatum</i>	Croton	Shrub	Euphorbiaceae	0	0	15
<i>Combretum indicum</i>	Rangoon Creeper	Climber	Combretaceae	0	1	0
<i>Costus igneus</i>	Insuline plant	Herb	Costaceae	0	0	1
<i>Couroupita guianensis</i>	Cannon ball tree	Tree	Lecythydaceae	2	0	0
<i>Crataeva nurvala</i>	Varun	Tree	Capparaceae	0	1	0



<i>Crinum asiaticum</i>	Bhuishirid	Herb	Liliaceae	0	0	5
<i>Cymbopogon citratus</i>	Gavati-chaha	Herb	Poaceae	0	0	4
<i>Delonix regia</i>	Gulmohor	Tree	Caesalpiniaceae	12	5	2
<i>Dracena compacta</i>	Dracena	Shrub	Agavaceae	0	0	5
<i>Duranta erecta</i>	Duranta	Shrub	Verbanaceae	0	0	10
<i>Dypsis leutescens</i>	Cane palm	Palm	Arecaceae	0	8	0
<i>Emblica officinalis</i>	Awla	Tree	Euphorbiaceae	2	2	0
<i>Erythrina indica</i>	Pangara	Tree	Fabaceae	1	0	0
<i>Ficus benghalensis</i>	Wad	Tree	Moraceae	4	1	1
<i>Ficus benjamina</i>	Ficus	Tree	Moraceae	0	1	6
<i>Ficus elastic</i>	Rubber tree	Tree	Moraceae	2	0	1
<i>Ficus racemosa</i>	Umbar	Tree	Moraceae	3	1	1
<i>Ficus religiosa</i>	Pimpal	Tree	Moraceae	0	1	1
<i>Filicium decipiens</i>	Filicium	Tree	Sapindaceae	0	1	0
<i>Gliricidia sepium</i>	Giripushpa	Tree	Fabaceae	2	1	0
<i>Grevillea robusta</i>	Silver Oak	Tree	Proteaceae	0	0	3
<i>Helicteris isora</i>	Murudsheng	Shrub	Sterculiaceae	0	1	0
<i>Hibiscus rosa-sinensis</i>	Jaswand	Shrub	Malvaceae	0	0	1
<i>Ixora coccinea</i>	Ixora	Shrub	Rubiaceae	0	0	4
<i>Jacaranda mimosifolia</i>	Nilmohor	Tree	Bignoniaceae	2	0	0
<i>Jasminum auriculatum</i>	Jui	Climber	Oleaceae	0	0	2
<i>Jasminum grandiflorum</i>	Jai	Climber	Oleaceae	0	0	2
<i>Jatropha integerrima</i>	Jatropha	Shrub	Euphorbiaceae	0	0	10
<i>Justicia adatoda</i>	Adulsa	Shrub	Acanthaceae	0	0	3
<i>Lagerstroemia speciosa</i>	Taman	Tree	Lythraceae	0	4	3
<i>Leucaena latisiliqua</i>	Subabhul	Tree	Mimosaceae	6	4	4
<i>Mangifera indica</i>	Mango	Tree	Anacardiaceae	3	4	4
<i>Michelia champaka</i>	Sonchapha	Tree	Magnoliaceae	0	0	1
<i>Millingtonia hortensis</i>	Buch	Tree	Bignoniaceae	1	1	0
<i>Neolamarkia</i>	Kadamb	Tree	Rubiaceae	1	0	0



<i>cadamba</i>						
<i>Nyctanthes arbor-tristis</i>	Prajakt	Tree	Oleaceae	0	1	0
<i>Pandanus odorifer</i>	Kewada	Shrub	Pandanaceae	0	0	1
<i>Passiflora caerulea</i>	Krishnakamal	Climber	Passifloraceae	0	0	2
<i>Peltophorum pterocarpum</i>	Sonmohor	Tree	Caesalpinaceae	8	5	2
<i>Pimenta dioica</i>	All spice	Tree	Myrtaceae	1	0	0
<i>Pithecellobium dulce</i>	Madras Thorn	Tree	Mimosaceae	8	13	1
<i>Pithecellobium saman</i>	Rain tree	Tree	Mimosaceae	9	1	1
<i>Plumeria alba</i>	Pandhra Chapha	Tree	Apocynaceae	0	3	0
<i>Plumeria filifolia</i>	White chapha	Shrub	Apocynaceae	1	1	3
<i>Plumeria obtuse</i>	White chapha	Tree	Apocynaceae	0	2	5
<i>Plumeria pudica</i>	Wild plumeria	Shrub	Apocynaceae	0	0	4
<i>Plumeria rubra</i>	Red chapha	Tree	Apocynaceae	0	4	3
<i>Polyalthia longifolia</i>	Ashok-Khota	Tree	Annonaceae	21	6	0
<i>Pongamea pinnata</i>	Karanj	Tree	Fabaceae	0	3	1
<i>Pseudocalymma alliaceum</i>	Lasunvel	Climber	Bignoniaceae	0	0	1
<i>Psidium guajava</i>	Guava	Shrub	Myrtaceae	0	2	1
<i>Punica granatum</i>	Pomegranate	Shrub	Punicaceae	0	0	1
<i>Ricinus communis</i>	Erand	Shrub	Euphorbiaceae	0	0	1
<i>Rosa indica</i>	Rose	Shrub	Rosaceae	0	0	1
<i>Roystonea regia</i>	Bottle palm	Tree	Arecaceae	13	1	0
<i>Santalum albam</i>	Sandalwood	Tree	Santalaceae	0	4	2
<i>Sapindus laurifolius</i>	Ritha	Tree	Sapindaceae	0	1	0
<i>Saraca asoca</i>	Sitecha Ashok	Tree	Caesalpinaceae	1	1	1
<i>Semecarpus anacardium</i>	Bibba	Tree	Anacardiaceae	1	0	0
<i>Sesbania grandiflora</i>	Hadga	Shrub	Fabaceae	0	3	2
<i>Syzygium aromaticum</i>	Lavang	Tree	Myrtaceae	0	1	0



<i>Syzygium cumini</i>	Jambhul	Tree	Myrtaceae	1	4	2
<i>Tabebuia rosea</i>	Tabebuia	Tree	Bignoniaceae	1	0	0
<i>Tamarindus indica</i>	Chinch	Tree	Caesalpinaceae	1	0	5
<i>Terminalia arjuna</i>	Arjun	Tree	Combretaceae	1	0	0
<i>Terminalia bellirica</i>	Beheda	Tree	Combretaceae	1	0	0
<i>Terminalia catappa</i>	Jangli Badam	Tree	Combretaceae	1	1	0
<i>Terminalia muelleri</i>	Australian Almond	Tree	Combretaceae	1	0	0
<i>Thespecia populnea</i>	Bhend	Tree	Malvaceae	0	1	1
<i>Vetiveria zizanioides</i>	Wala	Herb	Poaceae	0	0	2
<i>Ziziphus mauritiana</i>	Bor	Tree	Rhamnaceae	1	0	0
			TOTAL=	160	114	176

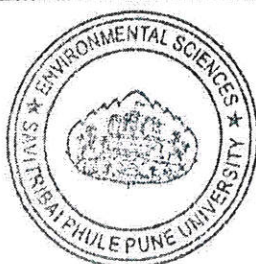
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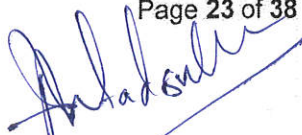
4.4 Waste Management

The committee constituted by the Union Ministry of Urban Development (1998 -2000) had reported that "Solid Waste Management has been one of the neglected areas of urban management activities in India. By and large, in cities and towns; hardly 50% of the solid waste generated is collected, transported and disposed off, giving rise to insanitary conditions and diseases, especially amongst the urban poor who constitute about 35% of the urban population." Even after 20 years of this report, the solid waste management systems in India are still the same with minor improvisations.

World Health Organization (WHO) has observed that 22 types of diseases can be prevented/ controlled in India by improving Municipal Solid Waste Management (MSWM) system. The Planning Commission Task Force (2014) identifies that "principal reasons for the prevailing unhygienic conditions in our cities is the casual attitude of the citizens as well as the municipal authorities towards managing solid waste, lack of priority to this essential service, inadequate and inappropriate institutional structure, lack of technical knowhow and paucity of financial resources".

Due to Covid 19 outbreak most of the campus activities were closed and therefore waste quantity data is on lower side. All the waste quantity data was taken from the campus institutes and the observations are made based on the information made available.



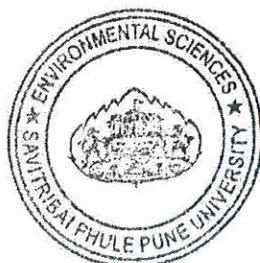
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Domestic Waste data

- Common Canteen = 0 kg/day total (mixed)
- Extended Canteen – IoT = 0 kg/day total (mixed)
- Primary school = 10 kg wet, 15 kg dry
- Common Garbage (entire campus) = 45 kg (mixed)

Observations:

- Separate bins are provided for the common garbage on the campus.
- The waste is handed over to the PMC workers.
- E-Waste and Battery waste is segregated and handed over to MPCB authorised dealer or recycler.
- There is no separate mechanism of treatment and disposal of chemical waste (liquid and solid)
- Metallic waste is handed over to the vendor.
- Paper waste is in large quantities and is measured once in three years. Part of the paper waste is reused for day-to-day printing and other activities.



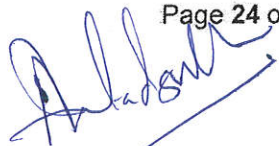
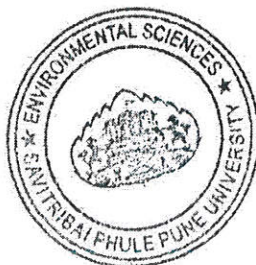
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Table No. 12: E Waste Generation

Sr. No.	Type of Waste	Institute Name							Total
		IOIT	Pharmacy	Engineering	Polytechnic	Institute of Management	Day school	Primary school	
1	CPUs	26	13	20	24	10	2	0	95
2	Monitors	11	13	21	26	10	2	0	83
3	Printers	21	0	3	1	1	0	0	26
4	Stabilisers	0	0	0	0	0	0	0	0
5	Photocopy Machines	0	0	0	0	0	0	0	0
6	Keyboards	9	7	22	18	10	2	0	68
7	Mouse	9	7	19	13	20	2	0	70
8	LCD	4	2	0	0	1	0	0	7
9	Water Purifier	0	3	0	0	0	0	0	3
10	CRO	3	0	0	0	0	0	0	3
11	Digital Multimeter	2	0	0	0	0	0	0	2
12	Other	1	0	0	0	0	4	0	5
13	Duel Power Supply	1	0	0	0	0	0	0	1
14	Trainer Kit	1	0	0	0	0	0	0	1
15	Differentiators	1	0	0	0	0	0	0	1
16	Precision Rectifier	1	0	0	0	0	0	0	1



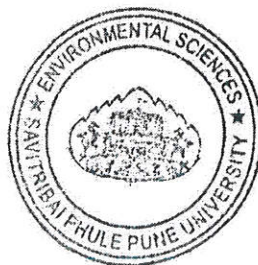
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	SWR								
17	8085 Cable and Connector	2	0	0	0	0	0	0	2
18	Variac Single Phase	1	0	0	0	0	0	0	1
19	Interphase Card	1	0	0	0	0	0	0	1
20	SERVER	2	0	0	0	0	0	0	2

Legend: DNA: Data not available

Table No. 13: Battery and other related Waste Generation

Sr. No.	Type of Waste / (nos.)	Institute Name							Total
		IOIT	Pharmacy	Engineering	Polytechnic	Institute of Management	Day school	Primary school	
1	Batteries	126	1	0	36	0	32	0	195
2	Inverters	0	0	0	0	0	0	0	0
3	UPS	3	7	0	0	0	0	0	10
4	Transformers	0	0	0	0	0	0	0	0



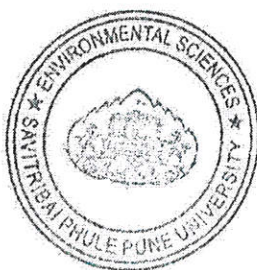
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Table No. 14: Paper and other related waste generation

Sr. No.	Type of Waste (in kg)/ annum	Institute Name							Total
		IOIT	Pharmacy	Engineering	Polytechnic	Institute of Management	Day school	Primary school	
1	Paper	10	0	500	DNA	15	20	50	595
2	Journals	460	0	500	DNA	0	10	0	970
3	Files	5	0	200	DNA	0	2	10	217
4	Notebooks	5	0	0	DNA	0	4	0	9
5	Books	0	0	0	DNA	0	4	10	14
6	Answer sheets	0	0	0	DNA	5	40	100	145
7	Forms	0	0	0	DNA	0	6	0	6
8	Magazines	0	0	0	DNA	0	4	20	24
9	News papers	0	0	1000	DNA	200	20	0	1220

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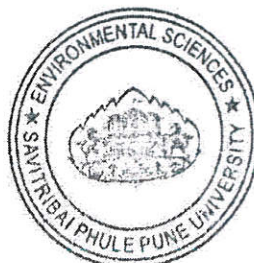
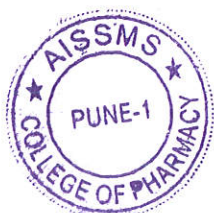
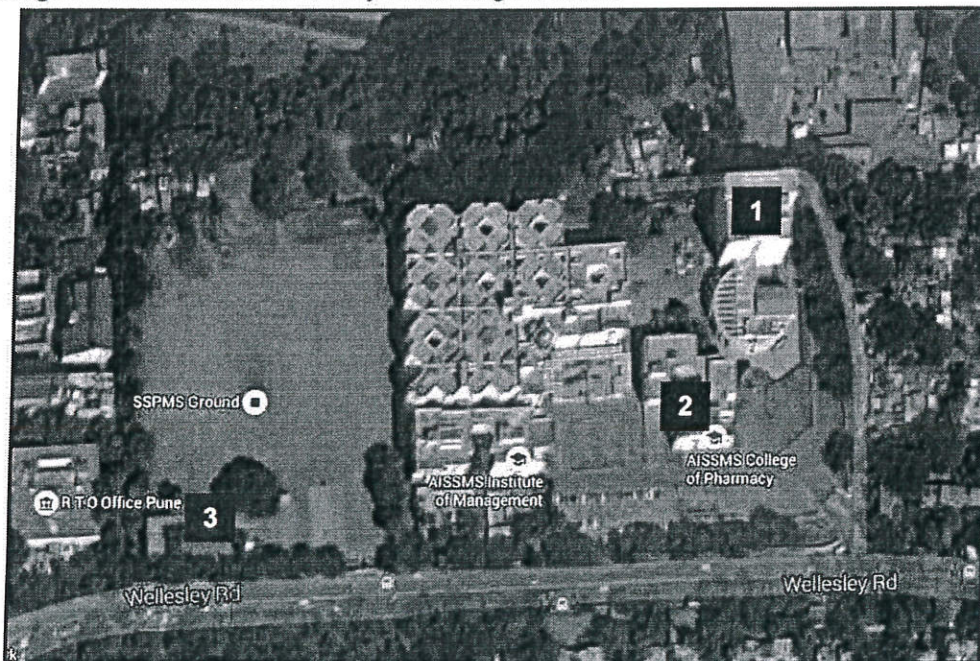
4.5 Air Environment

Air pollution has also become a critical issues India. Most of the urban conglomerations in India are highly polluted with recent case of Delhi air pollution. A survey in 2020, suggests that 22 of the 30 cities India have high air pollution with high doses of PM_{2.5}.

The air pollution is mainly caused by vehicle emissions, fuel, Industrial activities and coal fired power plants. The WHO further suggests that the vast majority of Indians breathe unsafe air. Air pollution causes asthma which is now soaring, even amongst the children. PM_{2.5} contributes to cancer and it kills by triggering heart attacks and strokes.

The locations for air quality sampling were chosen based on their proximity to various man made activities such as waste management plant, traffic, etc. The sampling was undertaken for 8 hours.

Image No.02: Ambient Air Quality Monitoring Locations



Observations

- The campus adjoins one of the busy road networks in Pune as well as has close proximity to the Rail station, Biomedical waste treatment plant, a cremation centre, Waste Water treatment plant and a chemical industrial unit e.g. Sudarshan Chemicals.
- The campus population (student, staff and others) is very high, which would bring in large number of vehicles (including two wheelers and four wheelers) which also contribute to air pollution.
- Table no. 15 shows air pollution levels are at different locations within the campus. This sampling was carried out on different dates through two weeks' time.
- The observations show low levels of PM₁₀ within the campus during day time.

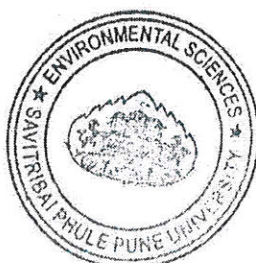
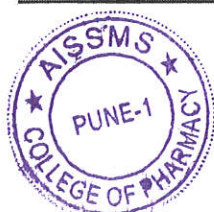
Table No. 15: Ambient Air Quality Observations

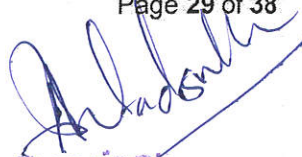
Sr. No.	Description	Unit	Near IOIT (1)	Near College of Pharmacy (2)	Near Day School (3)	NAAQ Standards	Standard Method
01	Sulphur Dioxide (SO ₂)	µg/M ³	19.1	21.3	22.7	≤ 80	IS 5182 (Part 2): 2001
02	Oxides of Nitrogen (NO ₂)	µg/M ³	28.5	30.6	31.8	≤ 80	IS 5182 (Part 6): 2006
03	Particulate Matter PM ₁₀	µg/M ³	55.4	57.2	61.7	≤ 100	IS 5182 (Part 23): 2006

Legend: NAAQ standard - National Ambient Air Quality standard.

4.6 Solar Energy

Solar power is energy from the sun that is converted into thermal or electrical energy. Solar energy is the cleanest and most abundant renewable energy source available, and the U.S. has some of the richest solar resources in the world. Solar technologies can harness this energy for a variety of uses, including generating electricity, providing light or a comfortable interior environment, and heating water for domestic, commercial, or industrial use.



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4.6.1 Solar Technologies

There are three main ways to harness solar energy: photovoltaic, solar heating and cooling, and concentrating solar power. Photovoltaic generates electricity directly from sunlight via an electronic process and can be used to power anything from small electronics such as calculators and road signs up to homes and large commercial businesses.

4.6.2 Solar power at AISSMS

Currently, due to Covid 19 outbreak the campus doesn't host students and the faculty in full strength. It is reported that about 50,000 units used in month, about 60% of the units are generated via Photovoltaics which is substantial. It is suggested to continue to use photovoltaics and add to the capacity once the student and faculty strength returns to full as the energy consumption will sharply rise.

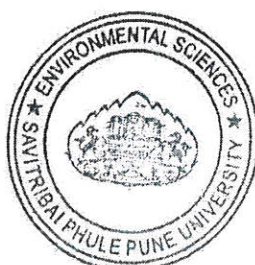
Table No. 16: Photovoltaic capacity

Institute	No of Panels	Total Capacity	Total Solar Power Generated (units/month)	Total Electricity Used (units/month)
COE	472	150 KW	30000	50000
COP	50	50 KW		
IOIT	320	100 KW		

5. Recommendations

5.1 Water Environment

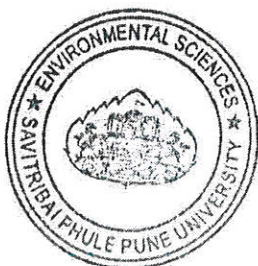
1. The campus buildings have high potential for the Rain Water Harvesting (RWH) due to large terrace areas as well as the open surfaces (paved and unpaved areas).
2. The campus already has started RWH in terms of the ground water recharge scheme which can further be boosted by storing rain water (only from roof top areas). This would satisfy part requirement of the campus in the monsoon season (i.e. about 80 – 90 days in a year) and thus reducing fresh water intake during rainy days.
3. It is recommended to install water efficient faucets and flushing systems across the campus which would reduce the fresh water requirement of the campus.



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4. Even though all the drain lines of the campus are connected to the common sewer line, it is suggested that if the management is looking forward to overall environmental sustainability then an Effluent Treatment Plant (ETP) may be installed. This would treat and recycle the waste water within the campus and this treated waste water can further be used either for flushing or landscaping, thus further reducing fresh water requirement of the campus by 50 – 60 % of the total.
 5. In order to use the treated waste water for flushing a separate plumbing system is required.
 6. It is recommended that liquid chemical waste from the laboratories should not be disposed without treatment.

5.2 Noise Environment

1. In order to make campus friendly for educational purposes, the noise levels need to be reduced as directed by Noise Pollution (Regulation and Control) amendment rules, 2000 and certain disciplinary measures need to be taken.
2. It is observed that due to the close proximity of the campus to the main road, rail station and other industrial, commercial activities, the noise levels are high. It ranges from 47 dB(A) – 80.3 dB(A) which at time is 30.3 dB(A) over the stipulated standard. This would mean students are getting exposed to high noise pollution levels within the campus due to either internal activities or external activities. This would create hurdle in learning and their overall health.
3. It is recommended that the campus to have noise barriers along the fence line either in terms of natural barriers such as trees or artificial barriers such as acoustic fence. A combination of both can also be used at appropriate locations.



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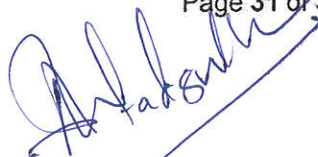
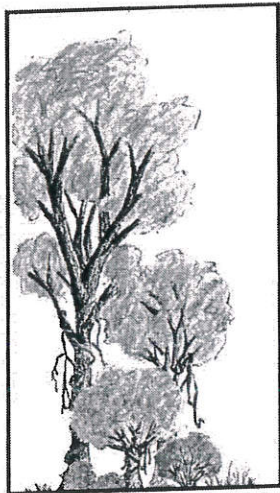
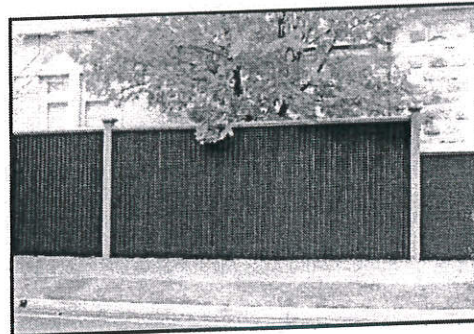

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Image No. 03: Types of noise barriers



Biological noise barrier - trees



Acoustic Fence

4. It is recommended that parking lots within the campus to be made strictly as no honking zones and vehicles with unwarranted vehicle silencers (mufflers) not be allowed.

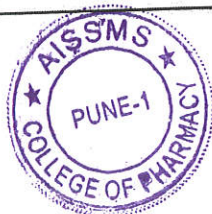
5.3 Plant diversity

For maintaining the college campus green and eco-friendly, more trees need to be planted. A thick green belt (of *Ficus benjamina*) development along the fence is strongly recommended. The plant diversity shall be maintained by avoiding the plantation of exotic plant species. A tree monitoring committee shall be established, if not at present. The college authorities should ensure frequent meetings with the tree monitoring committee.

Carbon dioxide neutrality can be maintained on the campus by developing more greenery. The plant species that are found suitable are suggested for plantation and greenbelt development. In addition to above some flowering plants, shrubs, herbs, and climber plants species will also be planted for beautification in the campus.

Criteria for selection of tree species:

The choice of species is based on the adaptability to the site, early returns, multiple uses, complimentary role to the system and its possible role during the lean/critical periods. The key factor contributing to the success of tree planting is selection of suitable tree species. Some of the considerations for selection of tree species are:



- Adaptation to local soil and agro-climate condition.
- Drought resistant species that can survive long dry periods.
- Multipurpose use species.
- Species that can serve for soil and water conservation.
- Species that help in building up soil fertility.
- Species that have good coppicing ability.

For the purpose of landscaping, following eight categories are being considered.

1. Avenues – Trees to shade roads or create avenues within property.
2. Parking - Shade giving trees for open parking lots.
3. Ornamentals – the purpose indicates:
 - a. Thicket – To be grown in groups to form a thick vegetated corner, centre or pocket.
 - b. Isolation - To be planted singly either in corners or as central attraction.
 - c. Scattered - To be planted at random to be able to appreciate its ornamental nature.
 - d. Groups – To be grown in groups of 3 to 4.
4. Hedges/Edges/Screens. –
 - a. Hedges for property hedges, for demarcating areas etc.
 - b. Edges for edging of small flower patches, for setting boundaries, for layering etc.
 - c. Screens - Provide privacy, as screens from pollution from adjoining road or to provide shadow from south sun.
5. Ground covers – These include native lawn varieties and plant species that spread laterally and can be used to cover soil below trees etc.
6. Temple plants – Trees normally associated with religious areas.
7. Climbers – Plants that can be used for forming trellis, etc.
8. Aquatic plants – For ponds or water bodies. Some of these plants need to be maintained by regular pruning to prevent excessive growth.

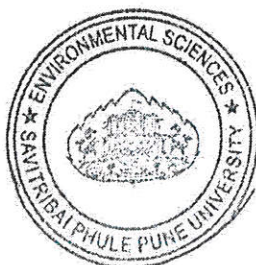
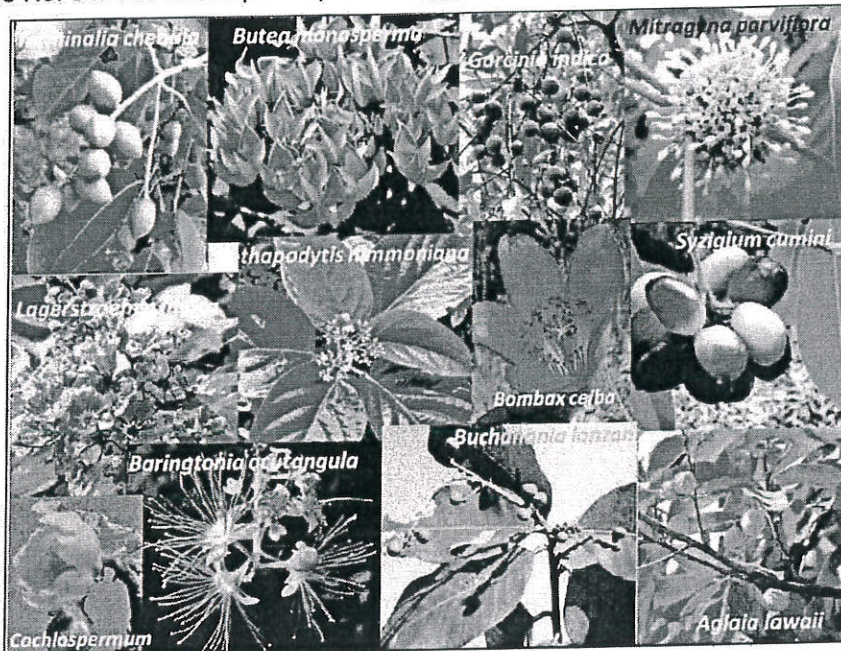


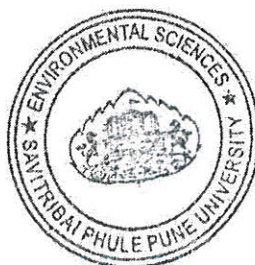
Image No. 04: The native plant species suggested for plantation in the college campus.



The plant species suggested for green belt development in addition to the present one-layer vegetation boundary will also helpful for mitigating gases and particulate matter as also to act as reducing noise from the heavy traffic road close to the campus will serve for long time.

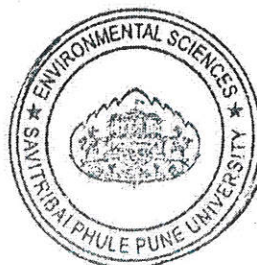
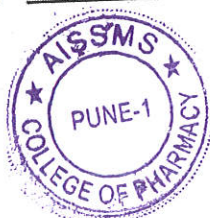
Table No. 17 – List of suggested plants

Botanical Name	Local Name	Family	Habit	Flower Color
First Row-trees (outermost)				
<i>Ficus benjamina</i>		Moraceae	Tree	Yellow pale
<i>Drypetes roxburghii</i>	Putranjiva	Euphorbiaceae	Tree	Greenish Yellow
<i>Holoptelea integrifolia</i>	Wavli	Ulmaceae	Tree	Greenish
<i>Tamarindus indica</i>	Chinch	Caesalpinaceae	Tree	Yellowish pink
<i>Terminalia bellirica</i>	Beheda	Combrataceae	Tree	White
<i>Terminalia chebula</i>	Hirda	Combrataceae	Tree	White
<i>Terminalia cuneata</i>	Arjun	Combrataceae	Tree	Yellow
<i>Terminalia paniculata</i>	Kinjal	Combrataceae	Tree	Greenish-white
<i>Terminalia tomentosa</i>	Ain	Combrataceae	Tree	White



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Botanical Name	Local Name	Family	Habit	Flower Color
<i>Alstonia scholaris</i>	Satvin	Apocynaceae	Tree	White greenish
<i>Bambusa arundinacea</i>	Bamboo	Poaceae	Bamboo	White, greenish
<i>Dendrocalamus strictus</i>	Velu	Poaceae	Bamboo	Blackish
<i>Cordia dichotoma</i>	Bhokar	Boraginaceae	Tree	White
<i>Dalbergia latifolia</i>	Shisam	Fabaceae	Tree	White
<i>Diospyros peregrine</i>	Tembhurni	Ebenaceae	Tree	White creamy
<i>Garcinia indica</i>	Kokam	Clusiaceae	Tree	Yellowish
<i>Haldina cordifolia</i>	Hedu	Rubiaceae	Tree	Red yellowish
Shrub Layer				
<i>Gardenia gummifera</i>	Dikemali	Rubiaceae	Shrub	White
<i>Ixora coccinea</i>	Bakara	Rubiaceae	Shrub	Orange / Red
<i>Ixora nigricans</i>	Kat-kuda	Rubiaceae	Shrub	White
<i>Justicia adhatoda</i>	Adulsa	Acanthaceae	Shrub	White
<i>Helicteres isora</i>	Murudseng	Sterculiaceae	Shrub	Red bright
<i>Murraya koenigii</i>	Kadhipatta	Rutaceae	Shrub	Greenish White
<i>Murraya paniculata</i>	Kunti	Rutaceae	Shrub	White
<i>Hiptage benghalensis</i>	Madhvilata	Malpighiaceae	Climber	White
<i>Ehretia laevis</i>	Ajan	Ehretiaceae	Tree	White
<i>Vitex negundo</i>	Nirgudi	Verbenaceae	Shrub	Bluish - Purple
<i>Woodfordia fruticosa</i>	Dhyati	Lythraceae	Shrub	Red
<i>Gardenia resinifera</i>	Dikemali	Rubiaceae	Shrub	White
<i>Cassia auriculata</i>	Tarwad	Caesalpiniaceae	Shrub	Yellow
Second Row (from outside)				
<i>Artocarpus heterophyllus</i>	Phanas	Moraceae	Tree	Green
<i>Azadirachta indica</i>	Neem	Meliaceae	Tree	White
<i>Bauhinia recemosa</i>	Apta	Caesalpiniaceae	Tree	White
<i>Butea monosperma</i>	Palas	Fabaceae	Tree	Orange-red
<i>Lagerstroemia microcarpa</i>	Nana-bondara	Lythraceae	Tree	White
<i>Lagerstroemia reginae</i>	Taman	Lythraceae	Tree	Pink
<i>Kydia calycina</i>	Warung	Malvaceae	Tree	White
<i>Mangifera india</i>	Amba	Anacardiaceae	Tree	Green



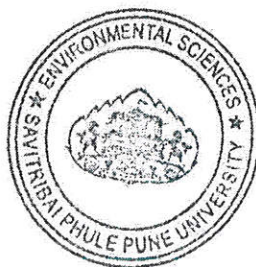
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Botanical Name	Local Name	Family	Habit	Flower Color
Along the paths				
<i>Caryota urens</i>	Bherali mad	Arecaceae	Tree	Red and green
<i>Cassia fistula</i>	Bava	Caesalpiniaceae	Tree	Yellow
<i>Mammea surgia</i>	Surungi	Clusiaceae	Tree	White
<i>Phoenix sylvestris</i>	Shindi	Arecaceae	Tree	White
<i>Nyctanthes arbor-tristis</i>	Parijatak	Oleaceae	Tree	White
Other Suggested Plants				
<i>Madhuca latifolia</i>	Moha	Sapotaceae	Tree	White
<i>Mallotus philippensis</i>	Kumkum	Euphorbiaceae	Tree	Yellow
<i>Manilkara hexandra</i>	Khirmi	Sapotaceae	Tree	White
<i>Memecylon umbellatum</i>	Anjani	Melastamaceae	Tree	Bluish - Purple
<i>Michelia champaca</i>	Sonchafa	Magnoliaceae	Tree	Yellow
<i>Mimusops elengi</i>	Bakul	Sapotaceae	Tree	White
<i>Mitragyna parvifolia</i>	Kadam	Rubiaceae	Tree	Red yellow
<i>Morinda pubescens</i>	Bartondi	Rubiaceae	Tree	White
<i>Neolamarckia cadamba</i>	Kadamb	Rubiaceae	Tree	White creamy
<i>Pandanus odoratissimus</i>	Kewada	Pandanceae	Tree	Yellow golden
<i>Pongamia pinnata</i>	Karanj	Fabaceae	Tree	Pinkish white
<i>Santalum album</i>	Chandan	Santalaceae	Tree	Brownish red
<i>Sapindus laurifolius</i>	Ritha	Sapindaceae	Tree	White
<i>Semecarpus anacardium</i>	Bibba	Anacardiaceae	Tree	Greenish white
<i>Syzygium cumini</i>	Jambhul	Myrtaceae	Tree	White
<i>Thespesia populnea</i>	ParasBhendi	Malvaceae	Tree	Yellow
<i>Trema orientalis</i>	Gol	Ulmaceae	Tree	White creamy

5.4 Waste Management

1. It is found that in the buildings the wet garbage is not segregated from the dry garbage and it is collectively handed over to the corporation, it is recommended that the wet garbage to be segregated appropriately which further can be processed and treated within the campus either by using vermicomposting or biomethanation process. The fertilizer from either of the methods can further be used as manure for the landscaping within the campus. If the biomethanation is to be used to treat the



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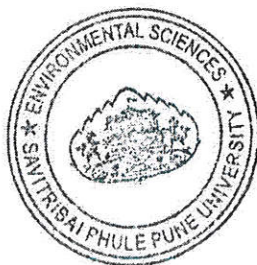
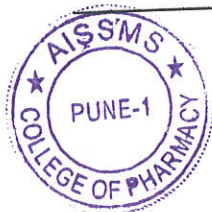
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- wet garbage, the biogas generated from the process can be used for the canteen either for common canteen / IOM / IOIT extended canteen.
2. Chemical waste (solid/semisolid) from the laboratories not to be disposed in municipal solid waste. Based on the physico-chemical properties of the waste, it should be handed over to the MPCB authorised chemical/ hazardous waste management facility only.
 3. High quantity of the paper waste is observed in the campus. Hence recycled paper to be used for day to day printing and other activities.

5.5 Air Environment

1. It is recommended that only Pollution Under Control (PUC) Certificate holding vehicles to be allowed in the campus.
2. Trees tolerant to air pollution to be planted along the fence line.
3. Possible air pollution (mainly of PM₁₀ and PM_{2.5}) may be occurring due to the biomedical waste treatment plant and / cremation centre to the north of the campus. It is suggested that a detailed air pollution study with respect to the biomedical waste treatment plant and / cremation centre and the institute campus to be carried out to identify the exact source of the air pollution and appropriate measures to be taken.

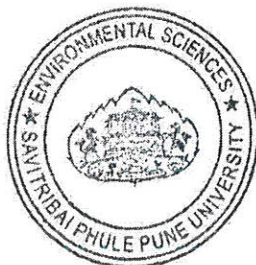
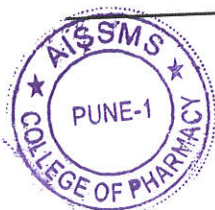
5.6 Safety Aspects

1. Teaching and non-teaching staff to be trained for emergency situations.
2. Emergency exits to be established for the spaces including laboratories.
3. Fire extinguishers, sprinklers to be placed as per fire safety rules at appropriate locations.
4. Periodic mock drills to be conducted.
5. Personal Protective Equipment (PPE) to be used at locations including chemistry laboratories to avoid any accident.
6. Parking safety to be followed.
7. Special safety features to be followed at Day School and Primary School.

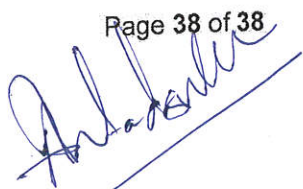


6. Audit and Reporting Team

Sr. No.	Name	Education
1	Dr. Venkat Gunale	M.Sc., Ph. D. (Ecology)
2	Dr. D. M. Mahajan	M.Sc., Ph. D. (Plant Diversity and Ecology)
3	Dr. Rohit Bhagwat	M.Sc., MESPOM, Ph. D. (Solid Waste Management, Water Management)
4	Dr. Sanjay Kale	M. Sc., Ph. D. (Waste Water Management)
5	Mr. Pawan Soyam	M. Sc. (Ph. D. student) (Ambient Air Quality Monitoring, Noise Monitoring)
6	Mr. Sandip Nivdange (Project coordinator and Audit Reporting)	M. Sc. (Ph. D. student) (Ambient Air Quality Monitoring)



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