



**GREEN AUDIT REPORT  
FOR  
GURU GOBIND SINGH EDUACTIONAL  
SOCIETY TECHNICAL CAMPUS**



**Elion Technologies & Consulting Private Limited**

307, 3<sup>rd</sup> Floor, DDA Lal Market, H-Block

Vikas Puri, New Delhi-110018

Contact No: +91 9013923982,+91 9013890526

Web: [www.elion.co.in](http://www.elion.co.in).



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## Acknowledgment

Elion Technologies and Consulting Pvt Ltd places on record it's thanks to Guru Gobind Singh Educational Society's Technical Campus for entrusting the task of conducting green audit study.

We acknowledge with gratitude the whole hearted support and cooperation extended by all team members while carrying out the study.



## Site Information

|                              |   |
|------------------------------|---|
| <b>Name of College</b>       | Guru Gobind Singh Educational Society's Technical Campus  |
| <b>College Address</b>       | Guru Gobind Singh Educational Society<br>Guru Gobind Singh Public School, Sector - V/8,<br>Bokaro Steel City - 827006 |
| <b>Execution Partner</b>     | ELION Technologies & Consulting Pvt Ltd   |
| <b>Communication Address</b> | 307, 3rd Floor<br>DDA Lal Market<br>H-Block Vikas Puri, New Delhi, 110018   |
| <b>Date of Audit</b>         | 19 <sup>th</sup> April 2024   |
| <b>Year of Audit</b>         | 2023 – 2024   |
| <b>Audit Participants</b>    | Dr. Priyadarshi Jarohar (Director)<br>Dr. R.P. Verma (Dean)   |
| <b>Total College Area</b>    | 14.0 Acres  |
| <b>Total Green Area</b>      | 6.60 Acres  |



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## Overview of Institute

The Guru Gobind Singh Educational Society's Technical Campus (GGSESTC) has started its journey of academic excellence in the year 2011. The Technical Campus is promoted by Guru Gobind Singh Educational Society.

The Guru Gobind Singh Educational Society established in 1979, is non-profit organisation working in the field of technical education. The Society has many schools running under its umbrella at various parts of the country. After 32 years of service to the society nationwide, it has been decided by the society to establish a Technical Campus in the name of Guru Gobind Singh Educational Society's Technical Campus at Bokaro, Jharkhand.

The institute has a lush green sprawling campus spread over about 20 acres of land within the vicinity of twin city of Chas and Bokaro at Jharkhand. It is a fully self-financed institute.

We are paving the path for significant development & tremendous growth of our budding professionals graduating from GGSESTC for global perspective for sustainable impact on the society. We feel the amount of time our students spend here should be focussed on developing them to be a professional with never ending zeal to learn, innovate & experiment. Our faculty members have humongous knowledge base in their field of work. They facilitate transfer of learning very well with the kind of experiences & distinguished qualifications they possess. We focus on individual development of our students in Technical as well as soft skills by conducting & organising various training programmes, workshops, seminars, guest lectures & industrial visits by eminent professionals from well renowned Institutes, Colleges & Industries.

We have one of its kinds of State-of-the-art Infrastructure and facilities with well-equipped labs, advanced & developed Technologies.

Our alumni have performed remarkably well in their fields of interest. We believe that they have always made us proud and they are the flag bearers of our brand's excellence.

We wish you a pleasant navigation through our website.

### VISION

To provide world class education, training and research opportunities in fields of Technology Management and other disciplines.

### MISSION

To be centre of academic excellence and an ecosystem vehicle for aspiring technologists and entrepreneurs.



## OBJECTIVE

To be amongst top institutions in Jharkhand in terms of:

- Engaging with Indian corporates and institutions for knowledge sharing and development of the institute.
- Dissemination of knowledge through Research & Training.
- Improving through Rankings and Accreditations.
- Adoption of Contemporary Technology in Teaching, Learning and other processes.

## List of courses offered by the institute:

Following are the list of courses offered by the institute-

- Bachelor of Technology (CSE, ECE, EEE, ME, CE)
- Master in Business Administration
- Bachelor of Business Administration
- Bachelor of Computer Applications



## Introduction

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of institute. It aims to analyses environmental practices within and outside of the concerned place, which will have an impact on the eco-friendly atmosphere. Green audit is a valuable means for a college to determine how and where they are using the most energy or water or other resources; the college can then consider how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students' better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus 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.

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric CO<sub>2</sub> from the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through carbon footprint reduction measures.

### Advantages of Green Audit:

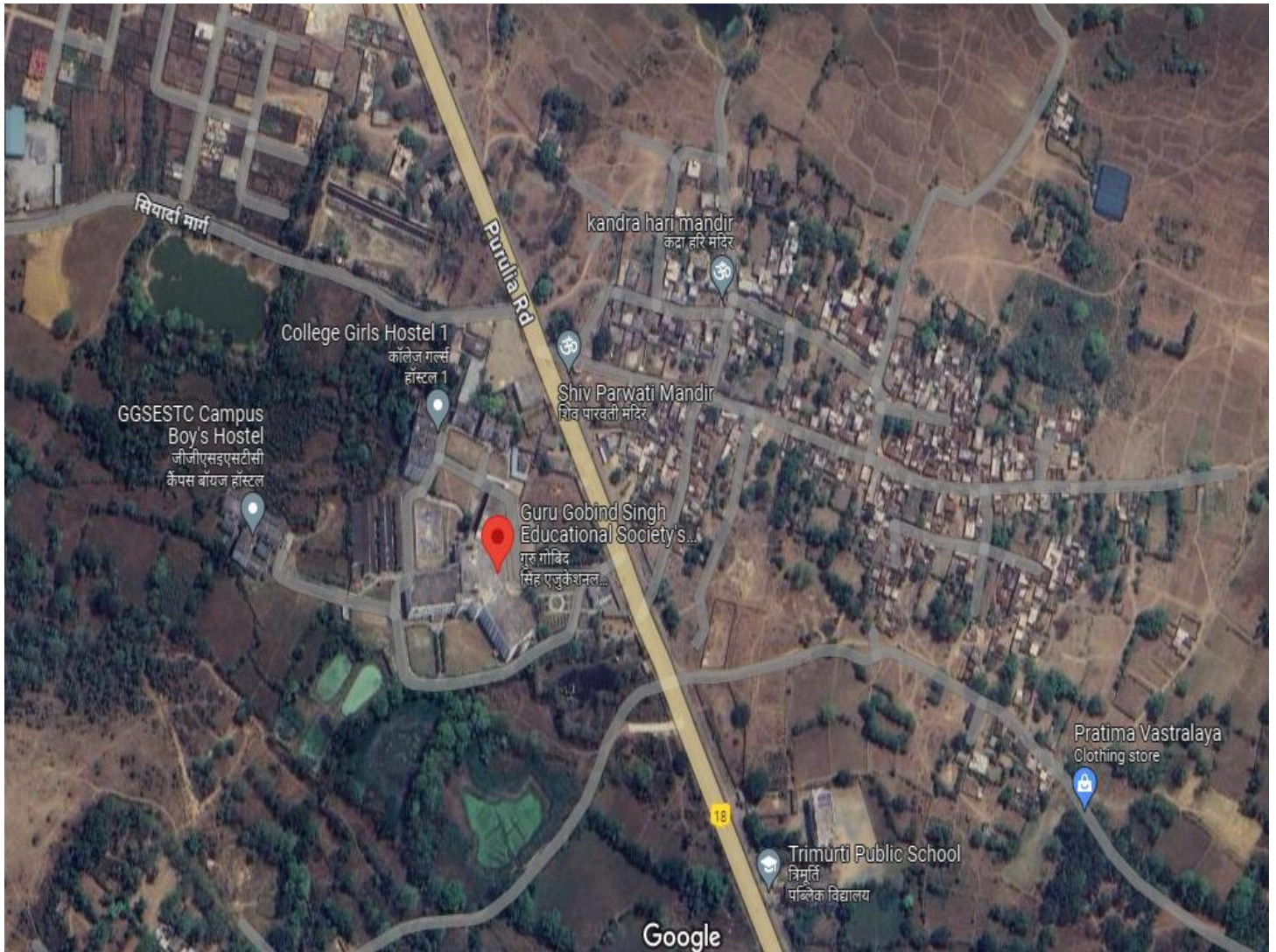
Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation. Some main advantages of green Audit are:

- It helps to shield the environment.
- Minimizing the waste and managing the cost.
- Authenticate conformity with the implemented laws.
- Minimizing the energy consumptions and focus on green and clean energy.
- Ambient Environmental Condition.
- Awareness and Training on Sustainability for Students.
- Awareness about environmental guidelines and duties.



## Environment Setting

The land use around the campus is mix of commercial and residential use. Schools, Restaurants, restaurants etc are present around the campus.



Guru Gobind Singh Educational Society's Technical Campus





Location of Guru Gobind Singh Educational Society's Technical Campus



## Green Audit

For Green Audit following 13 major areas (including their subsections) were covered and compliance/ initiatives under these areas were verified/ validated.

- a) Good Daylight Design and Ventilation
- b) Water Efficiency
- c) Wastewater Management
- d) Indoor Air Quality
- e) Energy Efficiency
- f) On-site Energy Generation
- g) Temperature and Acoustic Control
- h) Paper Waste Management
- i) E-Waste Management
- j) Canteen and Solid Waste Management
- k) Universal Access and Efficient Operation and Maintenance of Building
- l) Green Belt
- m) Green Programs (Green initiatives)

### 3.1 Good Daylight Design and Ventilation

- a) Corridors are wide with good ceiling height. All the corridors receive good daylight.
- b) Classrooms and Library have large windows. Adequate daylight is received through the windows during daytime.
- c) Classroom walls, corridors and other areas are white-washed, this enhances the daylight received.
- d) Curtains are provided on some of the windows to avoid glare.
- e) Stair cases receive daylight through windows provided at various levels.



Good Daylight in Classrooms



Daylight in stairs and corridors

### 3.2 Water Efficiency:

- a) Groundwater is the source of water supply in the campus.
- b) Groundwater is then stored in overhead tanks of different capacities. These tanks are located throughout the campus, including the boys' hostel and the girls' hostel.
- c) RO plant are provided for drinking water at every floor.
- d) Normally mops are used for floor cleaning and hose is used for cleaning once a week.
- e) Water conservation faucets are used in the washrooms.
- f) Dual flushing system is not provided in the washrooms.
- g) Signages are not provided in washrooms emphasizing water conservation.
- h) Water from air conditioning unit and reject water from water purifiers are collected in buckets and used for gardening and cleaning.
- i) Rain water harvesting system is available and rainwater is stored in a tank and reused further as and when required.



Water tank available



RO Plant



Rainwater Harvesting Pits



### 3.3 Wastewater Management:

- a) Wastewater can be treated through a three-stage biological process and then reused for irrigation in gardens.

### 3.4 Indoor Air Quality;

Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, as it relates to the health and comfort of building occupants. Some common indoor pollutant are listed as below:

- Molds and other allergens – This may arise from water seeping into the building envelope or skin, plumbing leaks, condensation due to improper ventilation, or from ground moisture penetrating a building part.
- Carbon monoxide – Sources of carbon monoxide are incomplete combustion of fossil fuels.
- Volatile organic compounds (VOCs) – VOCs are emitted by paints and lacquers, paint strippers, pesticides, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions etc.
- Carbon dioxide – Due to human respiration
- Particulate matter – Due to construction and maintenance activities

Major observations under indoor air quality are as below:

- a) Split Air Conditioners are used in the labs, seminar hall etc.
- b) Indoor plants are already placed inside the campus. Potted plants act as natural filters, removing toxins like benzene, formaldehyde, and trichloroethylene from the air. These toxins are commonly found in carpets, paint, and cleaning products. By absorbing these toxins and releasing oxygen, potted plants can help you breathe easier and create a healthier indoor environment. Refer Annexure 1 for details.
- c) Indoor air quality tests are not carried. It is recommended to get air quality tested once a year.
- d) Small gardens and green area have been planted around the campus.



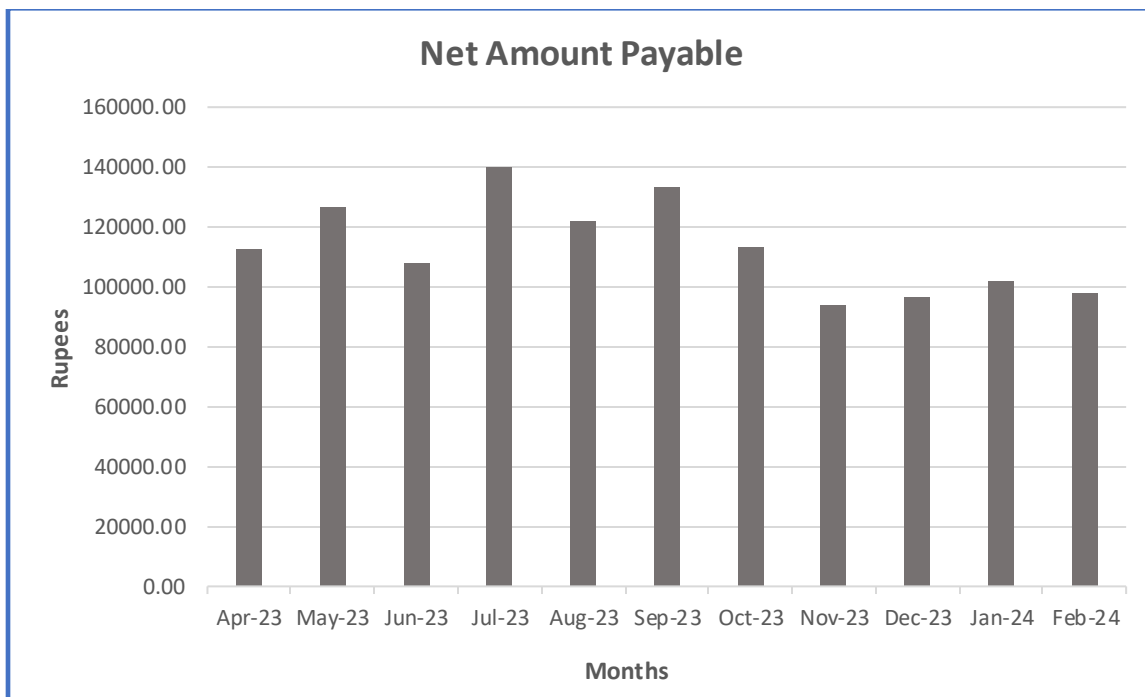
Air Conditioners used in the campus

### 3.5 Energy Efficiency:

#### Electricity:

Power is supplied by Jharkhand Bijli Vitran Nigam Limited. The major electricity consuming equipment installed in the campus are Air Conditioners, Water Coolers, Lighting, Desktop, Printers etc.

Following is details of energy consumption:





It was observed that:

- a) LED lights are installed in the campus.
- b) Campus has air conditioners which are in good working condition.
- c) Solar power system is also installed in the campus.



Solar Power Plant

### 3.6 On Site Energy Generation (usage of LPG/ Natural Gas):

- a) LPG is used for cooking purpose.
- b) Back Up diesel generator is available in the campus.



DG sets

### 3.7 Temperature and Acoustic Control

- a) White washed rooms & corridors and white/off-white flooring improve the lighting conditions.
- b) The campus has done tree plantation all around the boundary walls and



parking area.

- c) There is no noise pollution inside and around the campus.



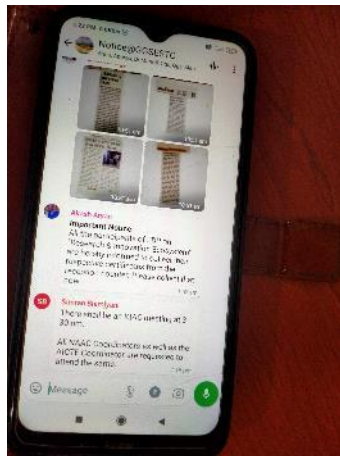
**Tree plantation**

### 3.8 Paper Waste Management:

Being academic institution, waste paper is the main solid waste generated in the premises. The College has taken steps to minimize and avoid paper usage.

It was observed that

- a) Prints and photocopies are taken on both sides of the pages to avoid excess paper usage. Rather than photocopy, digitalization (scanning) is practiced.
- b) Internal notices and communications are through Whatsapp.



**Internal communication via whatsapp**

- c) Faculty and administration staff uses old papers and envelopes for internal usages as rough work, file markers, page separators etc.
- d) Old papers and answer sheets are kept in a separate storage room and disposed off as and when required.





Storage Area

### 3.9 E-Waste Management:

- a) MOU with an external agency is signed for disposal of E-waste.



E-waste recycling certificate



E-Waste Collection Bin



### 3.10 Solid Waste Management:

It was observed that:

- Wet waste and dry waste segregation is practiced in the premises. Separate bins are provided for wet biodegradable and dry recyclable waste.
- Non Hazardous Waste – Daily garbage, canteen waste, carton papers, plastic and civil construction waste generated from premise on regular basis. The regular collection is done by Municipal Corporation for further dispose of at dumping site. There is designated garbage yard inside premise for the same.
- Biodegradable waste is mainly generated in canteen.



Garbage storage area

### 3.11 Universal Access and Efficient Operation and Maintenance of Building:

It was observed that:

- College is easily accessible. Staircase and ramps are provided for staff and students.



Ramps & Staircase



- b) Since the access and staircases are wide and uncluttered, it is possible to have a safe evacuation during emergency.
- c) Fire extinguishers are provided for emergency. They are inspected and serviced by fire protection Service Company annually.



Fire extinguishers provided

- d) Directional exit signages are missing. It is recommended to provide the directional exit signage near the staircases and exit pathway.



Reference Image

- e) Regular Fire Safety Trainings is given to staff and students on annual basis.



### 3.12 Green belt/ Landscaping:

- a) Large trees and plants are planted in the premises. Plantation also helps maintaining lower temperatures of the area.



Green Campus

### 3.13 Green Initiatives:

College is regularly celebrating important days such as Environment Day, Yoga Day, Earth Day etc as well as other cultural programs.





Cultural Programs



Tree Plantation



## Recommendations/Suggestions

### For Improving Energy Consumption:

- a) Every classroom and lab with central switch board can have a diagram linking location of a tube light, fan etc. with corresponding switch. This will ensure that correct fitting is switched on/ off and can save time & unnecessary operation.
- b) Installation of automatic lights with sensors can be considered.
- c) Standard Operation Procedures (SOPs) should be prepared and followed for green purchasing. Equipment with star rating, using eco-friendly materials; with safe disposal policy to be preferred. Policy of returning equipment at the end of life span to the supplier to be preferred.
- d) For purchasing new electronic appliances, star rating provided by Bureau of Energy Efficiency (BEE) should be considered. The equipment which has maximum star ratings could be purchased, which will consume less energy, ensure environmental sustainability and also operate at low cost.
- e) Usage of light reflectors is recommended as the reflectors can spread light to relatively large areas.
- f) If possible, computers should be switched off from main power connections.
- g) Notices/signages can be put up/displayed near switches and on notice boards, informing students and staff to switch off all electricals when not in use.
- h) Control sensors can help to reduce consumption by automatically dimming lights when people are not around, and keeping blinds open to use natural light & reduce energy consumption.
- i) Raise awareness:
  - Encourage students to help in monitoring energy consumption & implement corrective actions
  - Integrate energy education into classroom learning.

### Water Conservation:

- a) Provide information on water usage and savings to students/ staff through notices, screen savers in computer labs.
- b) Dry sweep or use a sponge broom when possible, instead of using a hose to clean floors, sidewalks, or other hard surfaces.
- c) Minimize/ reduce water usage by installing water saving faucets such as pressmatic taps, tap aerators, jet sprays etc.
- d) Dual-flush toilets are an effective way to conserve water.
- e) Signages are not provided in washrooms emphasizing water conservation.
- f) Installation of waterless urinals can be considered to reduce water consumption.



- g) Water balance diagram can be prepared to quantify the water consumption by installing water meters at key points. Based on data gathered, appropriate measures can be taken to reduce the water consumption.

#### **Paper and other Solid Waste Reduction:**

- a) Inventories of all solid waste generated in the premises must be maintained.
- b) Enhance recycling. This can be done by creating a group where students can recycle books, personal clothes and other material to needy students. This can be an initiative under green program.
- c) Standard Operating Procedures (SOP) for Solid and E-waste management and for recycling of waste should be prepared & practiced. The SOP's may include collection, segregation and reuse of different types of wastes, if any (e.g. biodegradable waste for composting). This will help in safe disposal of waste to recycle agencies.
- d) Training as well as awareness programs should be organized on segregation of biodegradable waste and recycling of waste. Efforts should be taken to inform students about recycling options and signs should be posted on appropriate bins indicating what could be dumped in each bin.
- e) The college can introduce online app, which can be useful for conducting internal exams, assignment/ reports submission. This system can also be used for displaying important notices, timetables.
- f) Paper usage shall be monitored to understand the impact of digitization in the facility.




#### **Others:**

- a) Environmental advisory committee could be formed. The discussions/ information sharing among different departments can generate lot of ideas and awareness on green issues.
- b) Maintain minutes of meetings of environmental committees; evaluate the effectiveness of various environmental programs conducted by the institutes. Set annual targets for Green Initiatives & monitor them closely. Create 'Green Champions'.
- c) Since each student uses computer lab, the screen savers can be set up for creating environmental awareness. (Ergonomics, water conservation etc.). Short 30 second pop up can be displayed on computer screens when they are on standby mode. Or wallpapers informing students about environment conservation can be created.
- d) Consider detailed energy audit (energy consumption, thermal emission, visual comfort) and water audit.
- e) Adopt environmentally responsible purchasing policy, and work towards creating and implementing a strategy to reduce environmental impact of its purchasing decision.







## Annexure 1 – Indoor Gardening Details

Indoor plants are commonly used for their aesthetics benefits but they also have vital role reducing airborne pollution. The right choice of plants can be an excellent way of improving indoor air quality and general health. Local landscape contractor can be contacted for supply and rotation of these plants.





| Plants  | VOC it removes                                    | Indoor source of VOC's                  | Plant care  |
|---|---|---|---|
| <br><b>Aloe Vera</b>           | Formaldehyde,<br>Trichloroethylene and<br>Benzene | Chemical based<br>cleaners and paints   | Easy to grow with<br>enough sunlight                                    |
| <br><b>Bamboo Plant</b>      | Formaldehyde,<br>Trichloroethylene and<br>Benzene | Paints, Plastics,<br>Wood products etc. | Thrives under low<br>light conditions as<br>well as easy to<br>maintain |
| <br><b>Chinese Evergreen</b> | Benzene   | Paints                                  | Low maintenance<br>plant that prefers low<br>light conditions.          |






|  |  |  |  |
|--|--|--|--|
|  <p>English Ivy</p>                   | <p>Formaldehyde,<br/>Benzene, Air borne<br/>fecal matter particles</p> | <p>Wood, Paper<br/>products, Air borne<br/>fecal – matter<br/>particles from pests</p>                                   | <p>Easy to maintain</p>  |
|  <p>Janet Craig</p>                   | <p>Formaldehyde,<br/>Benzene and<br/>Trichloroethylene</p>             | <p>Paints, Plastics,<br/>Wood products etc.</p>  | <p>Medium to low light<br/>tolerant plant.<br/>Requires little water<br/>for growth.</p>   |
|  <p>Golden Pothos or Devils Ivy</p> | <p>Formaldehyde,<br/>Cleanses air</p>                                  | <p>Exhaust fumes,<br/>carpeting<br/>materials, panelling<br/>and furniture<br/>products made with<br/>particle board</p> | <p>Extremely easy<br/>to maintain<br/>under low to bright<br/>light conditions. Fast<br/>growing<br/>and grows well<br/>under Fluorescent<br/>light.</p> |
|  <p>Mass Cane</p>                   | <p>Formaldehyde,<br/>benzene and<br/>trichloroethylene</p>             | <p>Paints, Plastics,<br/>Wood products etc.</p>  | <p>Medium to low light<br/>tolerant plant.<br/>Requires little water<br/>for growth.</p>   |



|   |  |  |   |
|---|--|--|---|
|  <p>Snake plant</p>          | <p>Formaldehyde and trichloroethylene</p>                | <p>cooking fuels, wood products, facial tissues, personal care products and waxed papers</p> | <p>Drought resistant and Tolerates a variety Of light conditions. Hard to damage or kill.</p> |
|  <p>Peace Lily</p>           | <p>Formaldehyde, benzene and trichloroethylene</p>       | <p>Paints, Plastics, Wood products etc.</p>  | <p>Relatively easy to maintain. Survives in low light conditions.</p>                         |
|  <p>Red-edged Dracaena</p> | <p>Formaldehyde and trichloroethylene</p>                | <p>cooking fuels, wood products, facial tissues, personal care products and waxed papers</p> | <p>Drought resistant and Tolerates a variety of light conditions. Hard to damage or kill.</p> |
|  <p>Spider Plant</p>       | <p>Formaldehyde, benzene, carbon monoxide and xylene</p> | <p>cooking fuels, wood products, Printing</p>  | <p>Easy to maintain under medium to bright light condition.</p>                               |



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|   |                     |   |                  |
|---|---------------------|---|------------------|
|  | Purifies indoor air | - | Easy to maintain |
| Parlor Palm   |                     |   |                  |



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## Elion Technologies & Consulting Private Limited

Registered Office:

307, 3rd Floor, DDA Lal Market, H-Block

VikasPuri, New Delhi-110018

Phone No: 011-28541888, 9013890526

Email: support@elion.co.in

Website: www.elion.co.in

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