1.0 ABOUT THIS GUIDELINE

The purpose of this guideline is to provide a common understanding of issues and good practice requirements involved in running efficient buildings, equipment, fittings & furniture and other assets of the Schools. This knowledge will help bridge the gaps between the various users involved in the operations, maintenance, management and administration of the facilities in the Schools and to ensure continuous benefits are derived from the use of the assets.

Structured to support the requirements of a wide range of users, this Guide can be read as a whole or for its stand-alone elements. It also acts as an initial reference for anyone involved with the facilities, including but not limited to:

- All students;
- All staff;
- Facilities managers/maintenance staff;
- Parents;
- Specialist service providers/contractors;
- Resident staff and their dependants;
- Visitors.

2.0 Why Facilities Management Guidelines in ACS and AIC?

Facilities Management (FM) involves guiding and managing the operations and maintenance of buildings, and other fixed assets of the Schools.

The facilities of the Schools within the main premises and in other locations are many in number and are specially designed for many users who are of different age and backgrounds.

The assets are made to last for a long period. It is therefore, imperative to set out a clear system to ensure benefits from the use of these assets over a long period of time.

2.1 The facility management team

The schools will strive to assemble a team of professionals and technicians with the following points under consideration at all times.

- The team is to possess varied qualifications in relevant disciplines;
- Dedicated to duty and work with passion and commitment;
- Will not compromise the safety of lives and properties within and outside the premises;
- Ready to improve their knowledge and skills;
- Honest and sincere in identifying problems areas and proffering solutions;
- Ready to seek permission and technical assistance whenever it is necessary to do so.

2.2 Responsibilities of Head of Facility Management/Maintenance Unit

The Head of Facility Management Unit organizes controls and coordinates the strategic and operational management of buildings and facilities in order to ensure the proper and efficient operation of all the physical aspects, creating and sustaining safe and productive environments for all users.

- He/she is to coordinate the services of the units with a team of technicians and outsourced professional service providers (individual or companies).
- He/she takes full responsibility that the services, meet varying needs to provide useful information, anticipate problems and plans ahead in dealings with all issues in other to create a conducive environment that all users can call their home.
- He/she relates with various contractors and suppliers in carrying out maintenance and upgrades, and providing services such as cleaning, property maintenance, water, electricity and other related items.
- The officer is to maintain good relationship with his or her team and promote good relationship between his staff and other members of staff/students.
- He/she will report other Head of instruction or any other person that may be so designated by the School Authority.

3.0 Energy/Electricity

The School buildings have the capacity to consume more energy than other single housing types. This is due to the provision of shared space and common area facilities and services, and the fact that most existing facilities serve the entire community. Improving energy efficiency and management is one of the key actions which must be taken to improve service delivery against rising electricity costs as well as reducing greenhouse gas emissions associated with the burning of fossil fuels for generation of electricity.

A number of factors contribute to energy consumption in the School premises which must be closely monitored. Some of the factors include:

- Lighting in common areas;
- Water pumping costs;
- The condition, and design of existing buildings and infrastructure;
- Air conditioning (cooling); and
- Many users are involved, most of whom are children.

Understanding how and where energy is consumed is critical to understanding a building's performance and potential to optimize consumption patterns. Typical common area or shared spaces, including class room, corridor, open or outdoor areas – particularly during the day.

3.1 Energy management process

Energy efficiency retrofit and improved management practices have the potential to result in significant cost savings and operational efficiency. The following step should be taken:

3.2 Establish an energy baseline

A basis from which to measure energy requirement or change. Baseline data can be collected from electricity bills or invoices, or other methods of computing utilization of power and should include at least some months to account for seasonal or termly variation. This step is required as new buildings are constructed or additional facilities and equipment are bought.

3.3 Develop an operational energy profile

Develop a picture of how the building operates throughout the day by checking buildings' energy consumption including off peak and peak times; for example, when classes are in session, the electricity supply to the hostels may be switched off and vice versa.

3.4 Undertake an energy audit

Energy audits are essential in the energy improvement process. This will help determine what control measures best work for the School. In some cases an expert advice may be sort to ensure critical elements are not overlooked.

3.5 Develop monitoring and reporting processes

Establish a system to collect, analyse and report on energy consumption and develop or purchase a system that records consumption and enables tracking against targets. Measure consumption against the initial energy baseline in order

to assess energy performance trends, the effectiveness of initiatives implemented and further opportunities to improve.

4.1 Communicate with residents and users

Discuss energy efficiency intentions with identified stakeholders to establish intentions, exchange information and seek input or support from residents. This is necessary in other to get their buy-in and cooperation at all times

5.0 Energy Management Techniques

5.1 Power Factor Correction

Power factor is a measure of how efficiently certain equipment makes use of the electricity network. Inductive loads, such as electric motors and fluorescent lights, draw more current from the electricity network than they need to perform the useful work they are designed to do. These additional currents are out of phase with the supply voltage and perform no useful work, but are required to maintain the magnetic fields within the devices. This means we may end up paying for more power than we actually need through the peak demand portion of the tariff. The concept is expressed as the ratio of power consumed (Kilo Watts) to current flow required (Kilo Volt Amps). A power factor of 1.0 is perfect.

5.2 Power Factor correction settings

Ensure power factor correction equipment is operating correctly, and the power factor is ideally above 0.98, or at least, >0.95.

5.3 Controls Strategy

Developing a control strategy can be one of the most effective ways to reduce building energy consumption. This should take into consideration, factors such as temperature set points, thermal comfort boundaries and hours of operation.

5.4 Peak Demand Management

Peak demand management is essentially minimizing electricity consumption during peak periods and maximizing consumption during off-peak or shoulder periods in order to minimize cost. Understanding which loads can be reduced without impacting building operations enables Facilities Managers to manage consumption in a way that will maximize cost savings.

5.5 Preventive Check

The maintenance team is to carryout regular check on internal and external power cables, distribution joints, changeover switches, power switches, etc to ensure that they are in excellent working conditions. Faults detected should be

reported and immediate actions taken to carry out the needed repairs or replacements.

6.0 Generators/other fittings

- Adequate security of the whole or parts of the generator must be pre-arranged;
- Adequate security of spare parts and fuel/diesel must be pre-arranged;
- Ensure pre-order levels of fuel/diesel ;
- Ensure good relationship with supplier(s) and have second options to avoid disappointment;
- Maintenance must be pre-arranged particularly;
  - Routine services;
  - Specific officer should be in-charge of the machines and
- Proper hand-over procedure when officers are on shift or during holidays or weekends.

6.1 Thermal Mass

The School facilities have large concrete structures such as stairwells or high rising walls which provide a large volume of thermal mass which can be used for the benefit of heating or cooling purposes.

The School plans to install motion sensors in stairwells so that lights are switched off when stairways are not in use. This will ensure thermal mass provides cooling services to the building rather than heating. This can have flow on benefits such as reduced demand on air conditioning and reduced electricity consumption costs.

7.0 Lighting

Lighting in common areas and open field is an area where substantial cost savings (often >50 and in some cases >80) can be achieved. More efficient lamps reduce heat gain, which in turn reduces air conditioning costs, and longer-life lamps need replacing less often, reducing maintenance costs. Installing energy efficient lighting technologies the way adopted by the School.

7.1 Lighting initiatives

- Establish mechanisms to ensure lights are turned off when not in use in class rooms, hostels, corridors, offices, outdoors, etc.;
- Officer(s) should be assigned specific responsibility with clear checking;
- Provide clear signage encouraging responsible lighting practices (e.g. turning lights off when not in use);

- Remove light bulbs in over lit areas (de-lamping) or where high luminance is not critical (e.g. corridors near windows);
- Lamp replacement using energy saving lamps;
- Reflector replacement – specular reflectors direct more light downward from fittings than standard reflectors;
- Motion sensors – automatically activate lights when a person enter a room, through heat or movement detection (e.g. common area bathrooms);
- Daylight-linked dimming system – photocell dimming controls sense natural light levels and turn lights down or off when sufficient daylight is available;
- Identify measures to show reductions in energy consumption.

Unauthorized connections and abuse of power consumptions

No staff (resident or not) or student is allowed to carry out unauthorized connections of electricity. All alternations or connections must be cleared and carried by the maintenance unit; and in some cases approval must be obtained from the school authority.

Any abuse or misuse of power/electricity will be severely dealt with by the school authority in order to safeguard lives and property.

8.0 Water Supply

As water efficiency and management is likely to become increasingly important because of the global climate change, water consumption and efficiency in the School will be given top priority in order to achieve significant operational savings and help our environment.

Before the school premises are connected to main water supply by the government of the Federal Capital Territory, the water supply is mainly from the boreholes dogged and maintained by the School.

8.1 Key water efficiency principles

Achieving water efficiency within the School is one of our key facility management objectives which require a sustained approach and good communication and engagement with all primary water users. Leak detection and management is generally recognized as the 'low hanging fruit' for water efficiency, as lighting replacement is for energy efficiency.

It is our policy to ensure that energy and water management should be considered together and an integrated solution developed (i.e. pumping water around a building has an associated energy cost).

The following steps among others should be undertaken by all the scheduled offices:

8.2 **Develop a water baseline**

A water baseline provides a basis from which to measure water consumption and changes. Data can be collected from metering if installed or the number of times the tanks are filled in a day and the volumes of the tanks. This can be done over a period of time to give an indication of fluctuations, based on weekdays, weekend or termly usage.

8.3 **Develop an operational water profile**

Develop a facility water use profile by collecting water consumption data and monitoring the consumption patterns of all the blocks/buildings and units.

8.4 **Engage with users**

While collecting consumption and other relevant data, engage with users to gauge their interest in achieving water improvements within their units. Establish a water utilization team to guide water efficiency initiatives, monitor performance, report achievements and promote awareness.

8.5 **Set performance targets**

Establish short and long term targets with consideration of the water baseline and available benchmarking data. Targets should reflect the environmental objectives, budget constraints, and what can realistically be achieved given the peculiarity of boarding school environment.

8.6 **Evaluate and implement initiatives**

Evaluate opportunities to reduce water consumption based on the returns gathered against targets and the level of difficulty for implementation.

8.7 **Monitor consumption and check for leaks**

Monitor water consumption and regularly inspect water fixtures and outdoor areas for signs of dampness/leakage.

Implement a proactive water leak detection strategy that identifies where the volume of leaks. This should be reported immediately to the head of facilities management unit. All reported leakage and damages must be attended to immediately.

8.8 Report performance and communicate results

Regularly measure water consumption against the initial water baseline, consumption trends, and reduction targets. Report performance and achievements to the School Authority for appropriate action. The Head of the unit is also empowered to engage the uses as many times as it is necessary to administer water efficiency in the School.

8.9 MEN AUTHORIZED CONNECTION AND WASTAGES

Any staff or student discovered to be engaged in authorized connection and wastages of water will be appropriately dealt with. The school authority reserves the right to take all necessary actions to control cost of services, damages to properly and the environment.

9.0 Waste

The Asokoro and Kaura Districts, where the Schools are located is not covered by the services of Abuja Environmental Agency. Accordingly the school has devised ways of managing collection and disposal of all types of waste. (It is the efficient management of this waste that the facility management Unit must be prepared for at all times).

9.1 Amenity Considerations

Waste collection, manual handling and disposal within a multi building premises can give rise to a number of nuisances, health and amenity related impacts such as noise from the garbage collection vehicles, odor, possible hygiene issues from waste awaiting collection, and other challenges.

9.2 Responsibilities

Managing waste on the day-to-day basis comes down to the residents/users responsible practices. The Facilities management unit typically plays an important role in supporting waste management through:

- Provision of separate storage and recycling spaces;
- Provision of hard waste collection locations;
- Management of charity rooms to store abandoned items;
- Managing cleaning subcontractors to ensure that waste is separated and appropriately disposed of;
- Regular Monitoring and reporting on waste performance;
- Educating residents on waste efficiency.

During building maintenance and refurbishment, waste should be managed through the promotion of reuse and recycling, packaging reduction and appropriate and timely disposal.

9.3 Waste efficiency options

Opportunities to improve waste management practices within the School facilities relate to the following considerations.

- Design collection and disposal system;
- Refurbish the equipment and tools required;
- Recycling and reuse some wastes;
- Education and awareness – this is a continuous process for both staff, students, contractors and visitors;
- Purchasing and procurement of appropriate materials;
- Contracts & agreements to cover all known areas affecting potential waste issues.

9.4 Cleaning Services

Daily and routine cleaning of the premises must be carried out to ensure a hazard free and beautiful environment conducive for learning.

This task may be carried out by in house staff. Students or out sourced. Whichever method that is used, this all important responsibility must be supersized to achieve completeness and top quality results.

Damages or stealing caused by contractor's staff must be fully paid for by the contractors or cost of replacement recovered from the fees charged by them. All wastes or waste bins contents gather from all clearing activities must be properly disposed of in the designated areas only.

10.0 Cleaning Maintenance

Our desire is to optimize the performance of the buildings and all facilities as this is the best 'first step' in ensuring it is financially and environmentally sustainable. For example, maintenance for greater energy efficiency is mandatory for all the facilities to ensure all assets are operating correctly and efficiently.

The following sections provide a general guide to maintenance in the School.

10.1 Maintenance planning

Maintenance activities fall into two basic categories - planned (i.e. routine maintenance) and unplanned (i.e. breakdowns). Manuals and specification documents should be used as a guide when developing a maintenance program which should clearly outline what needs servicing and when, as well as general

routine maintenance tasks, who will undertake them and when. The Head of the unit shall ensure this responsibility is given top most attention.

10.2 **Understand the need**

Ensure you know the clear objectives developed taking into account the needs and aspirations of the staff, students and other key stakeholders, including understanding at what critical times they are required. For example, security lights at nights etc.

10.3 **Develop Maintenance Strategies**

Ensure a maintenance strategy and supporting plan is put in place with benchmarks for in-house technicians and contractors. Consider incentives for maintenance contractors to enhance efficiency in operations and maintenance.

10.3 **Allocate Resources**

Ensure the fund required is requested for and collected ahead of time. Employ suitably trained and experienced professionals to carry out maintenance activities and associated monitoring, seeking professional advice where necessary. Avoid colluding with anybody to defraud or provide substandard material or services.

Document Requirements

Ensure key documentation is in place and accessible to contractors and in house technicians e.g. Manuals, Drawings, Maintenance Log Books, Commissioning Data. And user guide to relevant stakeholders to ensure that equipment and maintenance requirements are understood and adhered to.

10.5 **Monitor Progress**

Hold regular progress meetings and encourage team effort from all stakeholders in conducting their duties. Carry out monitoring using specialists where necessary.

10.6 **Planned maintenance strategy types**

Preventative Maintenance: Where a contractor regularly inspects, maintains and calibrates plant and equipment, providing reports to the appropriate officer approves any required work.

10.7 **Comprehensive Maintenance**

Similar to above, however a contractor may be employed for the work and sets their own work plan within a full service contract commissioned by the School.

Usually, comprehensive of work should be planned during holidays except on emergencies cases.

Areas carried in planned maintenance include:

- Air conditioning.
- Fire control systems.
- Fumigation and related pest destruction methods.
- Water system/tanks.
- Lighting, cabling.
- Pumps and fans.
- Electricity generator plants.
- Power Factor Correction System and
- Safety controls, etc.

11.0 Risk management

Within any set of facilities there are critical pieces of equipment (assets) which have a greater impact on overall performance. There is a need to identify what equipment is critical in ensuring the safety, comfort and amenity of the School.

Identify critical assets and regularly conduct their audit trail in order to understand the interdependency of the assets. In practice very few critical assets are stand-alone entities (e.g. electrical supply and a machine's electrical controls are both required in order for the machine to do work).

Identify and document replacement lead time. If assets or parts are able to be replaced promptly without significant impact on operations, they are unlikely to be critical and should be addressed as routine maintenance.

Identify and document replacement cost

Assets or components which are readily available but have such a high replacement cost that they cannot be easily funded may be critical assets and should therefore, be managed strategically as distinct from routine maintenance.

Conduct risk assessment

Fire is one of the greatest threats to the effective operation of assets and equipment; however other threats may include in house flood, water ingress, vandalism, mould, or smoke damage. Credible threats to the performance of each asset should be documented and a risk assessment conducted on each asset.

Protect critical assets

The risk assessment process should determine the controls necessary to manage threats to each critical asset, such as alarms, special monitoring, detectors or response equipment and processes.

12.0 Record keeping

Records of all works should be kept for all maintenance carried out in the Schools.

All programmed maintenance, in particular essential service maintenance, must be recorded accurately and be readily available. Contractors must ensure each scheduled inspection is recorded and signed by the person carrying out the maintenance.

- Logbooks must be provided for activities relating to essential services.
- Maintenance records will assist in planning for future asset replacement.

Maintenance Contractor records should include:

- Date of inspection, test or maintenance;
- Name of person(s) carrying out the inspection/maintenance;
- Details of any faults identified;
- Action taken to rectify any faults, including the date they were rectified;
- Cost of any rectification work outside the scope of the agreement with the School.

13.0 Safety

Facilities Management unit and indeed every resident/user have a clear legal and moral obligation to provide a safe physical environment for all members of our community and visitors.

The provision of a safe environment is critical for the long term utility value of any facility and presents an essential aspect of the duty of care that must be demonstrated by the various stakeholders who have the ability to do so.

While identifying and mitigating existing safety issues are important, equally is critical is the need to carryout safety planning, ensuring the systems and processes are in place to identify and deal with safety issues as they arise throughout the lifespan of an asset.

Effective safety planning also limits the consequences that can arise from poor safety procedures such as higher insurance premiums and unplanned high replacement costs resulting from a serious incident.

14.0 Dangerous Goods

Storage and use of dangerous goods and flammable substances within the premises have the potential to cause damage to property, the environment and risk to the lives of residents. The use of chemicals for routine activities such as cleaning can give rise to significant impacts on indoor environment quality, as well as affecting the health of cleaners or those in the immediate facility.

The term 'dangerous goods' covers a wide range of materials and products, many of which are commonly stored and used within the Schools, such as:

- Paints;
- Kerosene;
- Diesel;
- Petrol;
- Paint thinner;
- Primer;
- Oil;
- Glue;
- Solvents;
- Cleaning chemicals, etc.

Irresponsible disposal of chemicals (such as pouring them down the drain) can cause significant impacts to water and waste water drainage systems, waste treatment process, and the natural environment. Thus practice must be discouraged.

14.1 Hazardous Substances

It may seem easy to confuse dangerous goods with hazardous substances; however they are classified according to different criteria. Dangerous goods are classified on the basis of potential immediate physical or chemical effects, such as fire, explosion, corrosion and poisoning, affecting property, the environment or people on the other hand hazardous substances are classified on the basis of health effects alone (whether immediate or long-term). As a consequence of the need to control the different risks they present, dangerous goods and hazardous substances should be treated with utmost care.

Dangerous goods management involves:

- Knowing the type and volume of each of the dangerous goods used within the facility, and the disposal requirements associated with each type;
- Providing spill kits for clean-up of oil and diesel spills;

- Ensuring materials safety sheets are available at the point of use for all dangerous goods;
- Storing and using chemicals in accordance with standard best practices to avoid fumes and odors;
- Storing flammables goods in a lockable metal cabinets further away from light source or excessive heats;
- Ensuring service providers (such as cleaning and waste removal contractors) are adequately trained in the safe storage and handling of the dangerous goods they use, and incorporate requirements into contracts;
- Ensure large volumes of dangerous goods such as underground fuel storage tanks are properly located with controlled access.

Knowledge gained should be shared and recorded.

15.0 Contract Management

Contracts and out-sourcing are fundamental components of facilities management, and central to this is the identification and selection of a good network of contractors and suppliers. While the majority of skills necessary for building and facilities maintenance can be readily found, the School will require negotiation and management skills due to a growing diversity and complexity within the industry.

15.1 Contracts and Relationships

Contract relationships for procurement of facilities management and maintenance generally fall into two broad categories traditional procurement, and alliancing/partnering. Traditional procurement involves strict adherence to a defined specification or scope of work, whereas both partnering and alliance arrangements involve greater flexibility, and generally include incentives to encourage the delivery of better service.

Outsourcing is any task, operation, job or process contracted to a third party for a period of time. The majority of skill sets required for high rise residential facilities management and maintenance services (e.g. cleaning, air-conditioning maintenance, etc.) are relatively predictable and readily available (and therefore have predictable pricing). Any specialist skill sets which may be required at some point for facility operations and management should be identified and sourced well ahead of time.

15.2 Contractor Introduction

It is important to ensure all contractors and suppliers working within the School are adequately inducted. Consistent contractor induction processes should be developed and implemented including the following minimum requirements:

- A record of all employees and contractors inducted, including the date of induction;
- An introduction to the facility management team and other relevant personnel;
- Provisions for security cards and access keys;
- Verification of the ability to operate or maintain equipment;
- An outline of any work conditions or requirements;
- Copies of relevant contractor certificates, registrations, licenses, etc.;
- Work schedules;
- Specific occupational health and safety requirements;

16.0 Summary of key documentation

- Building or Asset Manual, describing how it is intended to operate under normal and abnormal conditions;
- Complete set of design and construction specifications and drawings, noting any changes to the original design;
- Complete set of maintenance manuals including as installed drawings;
- Complete and update set of schematics of all air, water, power, gas and hydraulics systems; as may be applicable;
- A complete asset register;
- Metering register linking meters to assets/buildings.
- Schedule showing special equipment and any household equipment connected to major source (light etc.).
- List of residential equipment including uses of dryers, heating, water heaters, air conditioners to enable assessment of constraints on system capacity;

- Current Occupational Health (OH) and Safety (S) manual;
- Fit out manual defining building design criteria and fabric performance limitations to ensure fit outs comply with building limitations;
- Register of switchboards with all connected loads and metering available on each board.

17.0 Contraventions

As explained in the earlier sections of this manual, the school authority will not compromise the safely of lines and property under its care. Accordingly, all contraventions to these rules or professional negligence or willful damage or fraud will be met with the appropriate disciplinary measure. Where sabotage is suspected, the relevant law enforcement agencies will be invited and legal actions will be taken by the School.

18.0 Linkage with other manuals

The contents of this manual or set of guidelines must be read and applied with the relevant sections contained in other handbooks, manuals or circulars that may be published by the school authority from time to time.

19.0 Changes and amendments

The contents of this manual may be altered, amended or new sets of guidelines introduced by the school authority at any time. It is therefore, the responsibility of all concerned to read and apply the up dated versions of approved maintenance guidelines released by the School. Where in doubt, please feel free to contact the Head of Maintenance Unit or facility manager or the appropriate authority at any time.