THE REPUBLIC OF UGANDA

MINISTRY OF HEALTH

NATIONAL GUIDELINES FOR

WASH IN HEALTH CARE FACILITIES

IN UGANDA

2022

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Foreword

Availability of sustainable water, sanitation and hygiene (WASH) services is critical to improving quality of care resulting into prevention, reduction and control of infectious diseases and associated mortality, improved occupational health, staff morale and performance and increased trust in health care services. In recognition of the importance of water availability and good hygiene during childbirth in particular, WASH is considered both a precondition and an entry point for good quality of care.

Given the that, infections related to poor WASH services in health facilities are among the causes of mortality and morbidity of patients, healthcare workers and visitors to the healthcare facilities, The Sustainable Development Goal (SDG) 3 and SDG 6 reinforce the need to ensure adequate WASH services, that will result into reduction in maternal mortality, ending preventable newborn deaths, and providing quality universal health coverage.

In order to contribute to the above SDGs, Ministry of Health, with support from UNICEF, WaterAid Uganda and other partners embarked on the development of the national WASH in Health care facilities guidelines. The rationale of the WASH guidelines is to document procedures and provide a framework for strategic planning, implementation of functional and effective WASH services in healthcare facilities in Uganda. These guidelines offer a basis of creating the minimum conditions required for providing healthcare services in a healthy environment for healthcare workers, patients and visitors to the healthcare premises. They also serve as a tool for monitoring the performance of WASH in health care facilities.

Ministry of Health, therefore, encourages all implementing partners and stakeholders as they address WASH challenges in health facilities to make use of the guidelines. The use of a standard approach by MOH and partners will enhance uniformity especially with respect to planning and budgeting, technical designing and construction, operation and maintenance, quality control and monitoring of WASH services in public, private-not-for-profit and private-commercial HCFs all over the country.

On behalf of MOH, I would like to thank all development partners for the financial and technical support, particularly UNICEF and WaterAid Uganda. I wish to extend my sincere thanks to all individuals that participated in the development of the National guidelines for WASH services in Health care facilities guidelines.

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Dr. Aceng Jane Ruth Ocero

MINISTER

Acknowledgement

The Ministry of Health wishes to express its sincere and deepest appreciation to the key government sectors, various development partners, nongovernmental organisations, individuals and stakeholders who contributed to the development of the National Guidelines for WASH Services in Health Care Facilities in Uganda.

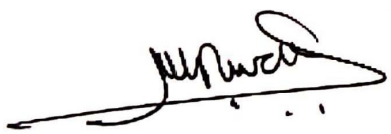
First and foremost, special thanks go to UNICEF Uganda and Water Aid Uganda for funding the development process, production and dissemination of the national guidelines for WASH services in health care facilities.

The development of the guidelines was done through a consultative process that brought various governmental and nongovernmental organisations from the water, sanitation and hygiene (WASH) sector. The Ministry of Health is particularly grateful to the following individuals for their commitment in accomplishing this task:

Kabangi Moses Mwigo (Ag. Commissioner Environmental Health Department), Okia Bosco (Principal Health Inspector - Ministry of health), Kalyebi Peter (Principal Environmental Health Officer-Ministry of Health), Mulabya Fred (Principal Environmental Health Officer-Ministry of Health), Kayanja Stephen (Senior Environmental Health Officer - Ministry of health), Batesaki Rogers (Senior Environmental Health Officer-Ministry of Health), Amodan Bob (Environmental Health Officer-Ministry of Health), Wandera Dickson – (Environmental Health Officer - Ministry of Health), Namwebe Mary – (WASH Officer UNICEF), Shivanarain Singh – (WASH Manager UNICEF), Jane Mselle Sembuche - (Country Director WaterAid Uganda), Ronald Ogwok – (Monitoring and Evaluation officer Water Aid Uganda), Denis Kayiwa – (WASH specialist Water Aid Uganda) and Kagga and Partners (consulting firm) for the development of the National Guidelines for WASH in health care facilities.

It is hoped that everything possible shall be done to promote WASH in health care facilities to enhance the minimum conditions required for providing healthcare services in a healthy environment for healthcare workers, patients and visitors to the healthcare premises.

For God and my Country



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Henry G. Mwebesa

DIRECTOR GENERAL HEALTH SERVICES

Abbreviations and Acronyms

AIC	AIDS Information Center
ANC	Antenatal
ART	Antiretroviral Therapy
CAFU	Children's AIDS Fund Uganda
CHWs	Community Health Workers
DHO	District Health Officer
DHMT	District Health Management Team
DHT	District Health Team
EHD	Environmental Health Department
EHO	Environmental Health Officer
F/P	Family Planning
GH	General Hospital
HA	Health Assistant
HC	Health Centre
HCF	Health Centre Facility
HFMCs	Healthcare Facility Management Committees
HCII	Health Centre II
HCIII	Health Centre III
HCIV	Health Centre IV
HCAI	Healthcare Associated Infections
HCW	Healthcare Waste
HCWM	Healthcare Waste Management
HI	Health Inspector
HIV	Human Immunodeficiency Virus
HLD	High Level Disinfection

HMIS	Health Management Information System
HSD	Health Sub District
IPC	Infection Prevention and Control
IPCAF	Infection Prevention and Control Assessment Framework
JMP	Joint Monitoring Programme
MMIS	Making Medical Injections Safer
MOH	Ministry of Health
NEMA	National Environment Management Authority
NHP	National Health Policy
NRH	National Referral Hospital
NWSC	National Water and Sewerage Corporation
O&M	Operation and Maintenance
UO	Umbrella Organization
PFP	Private For Profit
PHI	Principle Health Inspector
PNFP	Private Not For Profit
RRH	Regional Referral Hospital
SEO	Senior Environmental Officer
SHI	Senior Health Inspector
SOP	Standard Operating Procedures
TASO	The AIDS Support Organization
Ug.	Uganda
UNICEF	United Nations Children's Fund
VHTs	Village Health Teams
WASH	Water, Sanitation and Hygiene
WHB	Wash Hand Basin
WHO	World Health Organization

Glossary

"Alcohol-based hand rub" A liquid, gel or foam formulation of alcohol (e.g. ethanol, isopropanol), which is used to reduce the number of microorganisms on hands when the hands are not visibly soiled. They may contain emollients to reduce skin irritation and are less time-consuming to use compared with hand washing.

"Anatomical Waste" Anatomical waste comprises recognizable body parts. It is primarily for ethical reasons that special requirement must be placed on the management of human body parts. They can be considered as a subcategory of Pathological Waste.

"Antiseptic hand rubs" Applying a waterless antiseptic agent to hands e.g. Alcohol, which does not require use of exogenous water hence neither rinsing nor drying.

"Antiseptic hand wash" Remove or destroy transient microorganisms and reduce resident skin flora using an antiseptic or any other antimicrobial agent like a waterless alcohol-based hand rub.

"Aquifer" A body of rock and/or sediment that holds groundwater

"Black water" Wastewater and sewage from toilets

"Bye-laws" Are subsidiary laws or regulations made by a Local government, and only relate to a particular area that they have been made for.
These are standards and safeguards to workers during execution of activities, for their health and comfort and provision of adequate safety to the public in general

"Carer(s)" Refer to family, friends, or voluntary workers who accompany patients to a HCF and provide basic, non-professional care. Carer(s) may be occasional visitors, or they may stay to prepare food, clean and care for patients in an HCF.

"Changing room" A room within HCFs where health care workers dress in protective clothing and dispose of soiled and contaminated protective clothing.

"Cleaning" is a process which removes dust, soil, large numbers of microorganisms (germs) and the organic matter that protects them e.g. faeces, blood. Cleaning is an essential step prior to disinfection or sterilization. Cleaning physically removes rather than kills germs.

"Colour coding" Designation of different colours for the storage of different categories of health-care wastes.

"Compliance" means adhering to a rule such as a policy, standard, specification, or law, In medical its commonly used to describe the degree to which a patient correctly follows medical advice, mostly in regards to medicines, device use, self-care etc. Whereas for the health worker it's a medical compliance plan, which is a formal statement of a healthcare practice's intention to conduct itself ethically in regard to its operations, government regulations, patient service and care.

"Contamination" The soiling of inanimate objects or living material with harmful, potential infectious or unwanted matter

"Critical Patient Care Equipment" Equipment and devices that enter sterile tissue or the vascular system, such as surgical instruments, cardiac and urinary catheters.

"Cytotoxic waste" Cytotoxic Waste may be considered as a sub-group of hazardous Pharmaceutical Waste, due to its high degree of toxicity. The potential health risks for people who handle cytotoxic Pharmaceuticals results from the mutagenic, carcinogenic and teratogenic properties of these substances, which can be split into six main groups: alkylated substances, ant metabolites, antibiotics, plant alkaloids, hormones and others.

"Detergent" Compounds that possess cleaning action e.g soap

"Disinfectant" A chemical agent that is capable of killing most pathogenic microorganisms under defined conditions, but not necessarily bacterial spores. It is a substance that is recommended for application to inanimate surfaces to kill a range of microorganisms. The equivalent agent, which kills microorganisms present on skin and mucous membrane, is called an antiseptic.

"Disinfection" is defined as the removal or destruction of all germs except bacterial spores and prions (e.g. CJD- 'Mad cow' disease). There are two main methods of disinfection, heat disinfection (e.g. method used in bedpan washers) and chemical disinfection (e.g. bleaches and alcohols).

"Disposal" Intentional burial, deposit, discharge, dumping, placing or release of any waste material into or on any air, land or water. In the context of this document, disposal refers to the storage and subsequent destruction of all medical waste.

"Drinking water" Water with acceptable quality complying with national standards used specifically for drinking.

"Emergency" Sudden, unexpected, or impending situation that may cause injury, loss of life or damage which therefore requires immediate assistance or relief.

"Emerging infections" Are those that have appeared in a human population for the first time, may have existed previously over a long period of time, and pose a risk of increasing in a near future.

"Re-emerging diseases" Are diseases that once were major health problems globally and then decreased in incidence or was brought under control trough effective health care policies and improved living conditions reached the lowest point then begins to resurge as a health problem.

"Environmental surface" Floors, walls, ceiling, table tops etc.

"Facilitation" is a process of helping a group of people to understand and agree on an objective.

"Facility" A place, amenity, or piece of equipment or something designed, built, installed etc., to serve a specific function affording a convenience.

"Focal person" a person who serves as a coordinator or focal point of information concerning an activity or program.

"Flush toilet" Also known as a lavatory or water closet (W.C.) is the toilet that disposes human excreta (feces and urine) by using water to flush it through a drain pipe to another location for disposal.

"Gardening" refers to growing of plants, flowers and grass within the premises of the HCF with a goal of creating a beautiful environment within the landscape.

"Grey water" Also known as sullage, is all the wastewater generated in households or healthcare facilities /offices from streams without fecal contamination. Sources of grey water include sinks, showers, baths, washing machines or dish washers.

"Hand hygiene" Any type of hand cleansing

"Hand washing facility" An equipment providing an adequate supply of running potable water and soap and single use towels or hot air-drying machines mainly used for hand washing.

"Hazard" Any source of potential damage or harm or adverse health effect on something or someone.

"Health" A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.

"Health care" means the maintenance or improvement of health via prevention, diagnosis, treatment, recovery, or cure of disease, illness, injury, and other physical and mental impairments in people.

"Health Standards" Clear and verifiable requirements that must be met to achieve minimum essential environmental health conditions in health care facilities.

"Health Care Associated Infection" An infection occurring in a patient during the process of care in a health care facility, which was not present at the time of admission. Health care- associated infections can also appear after discharge should a person leave while incubating.

"Health Care Waste" A by-product of heath care services that include all waste, hazardous or not, generated in the process of performing medical activities.

"High Touch Surfaces" High-touch surfaces are those that have frequent contact with hands. Examples include doorknobs, bedrails, light switches, IV pole, door knobs, medication carts, wall areas around the toilet and edges of privacy curtains

"Highly Infectious Waste" Highly infectious waste includes all viable biological and pathological agents artificially cultivated in significant elevated numbers. Cultures and stocks, dishes and devices used to transfer, inoculate and mix cultures of infectious agents belong to this category of waste. They are generated mainly in Diagnostic Medical Laboratories. This category of waste can also be generated from Isolation wards of hospitals; centres caring for patients infected with Hepatitis viruses; pathology departments, operating theatres and laboratories.

"Hygiene" means conditions and practices of cleanliness that help to maintain health and to prevent the spread of diseases.

"Hygiene Conditions and Practices" Conducive to maintaining health and prevent spread of diseases especially through cleanliness, handwashing, menstrual hygiene management and food hygiene.

"Indicator" Measurable variable used as a representation of an associated (but non-measured or non-measurable) factor or quantity

"Infection control" Infection prevention and control (IPC) is a practical, evidence-based approach which prevents patients and

health care workers from being harmed by avoidable infections

"Infectious Waste" Infectious waste comprises of all biomedical and health care waste known or clinically assessed by a medical practitioner to have the potential of transmitting infectious agents to humans or animals. Waste of this kind is typically contaminated with blood or some other body fluid and is generated in the following places: health facility service delivery areas like outpatient departments, injection rooms, patient bedside, outreach posts, in homes and sometimes by the road side.

"Improved latrine" A sanitation facility, which ensures hygienic separation of human excreta from human contact

"Improved Sanitation Facility" One that hygienically separates human excreta from human contact. They include; flush/pour flush (to piped sewer system, septic tank and pit latrine); ventilated improved pit latrine (VIP); pit latrine with slab and composting toilet.

"Improved Water Source" A water source that by its nature of construction or through active intervention protects from outside contamination with fecal matter.

"Landscaping" Refers to a process of making a garden or a piece of land more visibly attractive by altering the existing design, adding ornamental features, and planting trees and shrubs.

"Litigation" A process of taking legal action

"Low-touch Surfaces" Surfaces that are minimally touched by healthcare workers and patients (e.g., walls, ceilings, floors)

"Mechanical Action" The physical action of cleaning—includes rubbing, scrubbing, and friction.

"Non-hazardous (domestic) Health Care Waste" Comprises all the waste that has not been infected or contaminated by blood or body fluids. It is similar to normal household or municipal waste and can be managed by the municipal waste services.

"Operation and Maintenance" Means functions, duties and labor associated with daily activities needed to maintain, repair, and replace parts and structural components, as well as preserve an asset so as to give continuity with acceptable service and prolong its life, but may go beyond the technical definition and include managerial aspects of running Water, Sanitation and Hygiene (WASH) infrastructures in a sustainable way.

"Pathological Waste" Pathological Waste includes body organs (including placentas), tissues as well as blood and body fluids and follows the precautionary principle stipulated by WHO.

"Patient Care Areas" any area where patient care is directly (e.g., examination room) and indirectly (e.g., medication preparation area) provided. Includes the surrounding healthcare environment (e.g. patient toilets)

"Patient Zone" The patient and his or her immediate surroundings. Includes all surfaces that are temporarily and exclusively designated for that patient.

"Penalty" A punishment imposed for breaking a law, rule or contract

"Personal Protective Equipment (PPE)" Clothing or equipment worn by staff to protect themselves against hazards (e.g., blood or body fluids).

"Point of Care" The place where three elements come together: the patient, the HCW, and care or treatment involving contact with the patient or his/her surroundings. Point-of-care products should be accessible without having to leave the patient surroundings

"pH" A quantitative measure of acidity or alkalinity of an aqueous or other liquid solution that is, a number on a scale on which a value of 7 represents neutrality and lower numbers indicate increasing acidity while higher numbers increasing alkalinity.

"Plain Soap" Detergents that contain no added antimicrobial agents.

"Privacy" A state of being free from public attention: In regard to sanitation it's the ability of a facility to provide protection from disturbance or being observed by other people; shelter offering security to the user.

"Private vs. shared toilets" Private toilets are dedicated to one person over a specified time period—environmental cleaning always takes place before their use by a different person. Shared toilets are used by more than one person within a specified time period and might not be cleaned before use by a different person.

"Radioactive Waste" Radioactive Waste includes liquids, gas and solids contaminated with radio nuclides whose ionizing radiations have genotoxic effects. The ionizing radiations of interest in medicine include X-ray, and radiotherapy. An important difference between these types of radiations is that X-ray emissions occur when the generating equipment is switched on unlike in radiotherapy where the emissions occur as long as the patient is on therapy.

"Regulations" A directive made and maintained by an authority

"Rehabilitation" The action of restoring something that has been damaged to its original state, or good working condition

"Reprocess" The process of cleaning and disinfecting a device or piece of equipment for reuse on the same patient (e.g., hemodialyzers) or other patients

"Resident Time" Refers to average time water is supposed to stay within the tank to avoid deterioration.

"Residual Chlorine" Amount of chlorine that remains in the water after a certain period or contact time.

"Routine Cleaning" The regular cleaning (and disinfection, when indicated) when the room is occupied to remove organic material, reduce microbial contamination, and provide a visually clean environment. Emphasis is on surfaces within the patient zone.

"Rules" A set of explicit or understood regulations or principles governing conduct or procedure within a particular area of activity

"Runoff" Is the flow of water occurring on the ground surface when excess rainwater, storm water, or other sources of water can no longer sufficiently rapidly infiltrate in the soil.

"Runoff Coefficient" Is a dimensionless coefficient relating the amount of runoff to the amount of precipitate received (Values varying with level of infiltration and runoff).

"Sanitation" Conditions relating to public health, especially the provision of clean

drinking water, cleanliness, protecting health, the disposal of sewage and solid waste etc.

"Safely Managed Sanitation" Referred to as the use of an improved sanitation where excreta is safely disposed in situ or excreta is transported and treated off-site.

"Safely Managed Drinking Water" Referred to as the use of an improved drinking water source which is located on premises, available when needed, and free of faecal and priority chemical contamination.

"Scheduled Cleaning" cleaning (and disinfection, when indicated) that occurs concurrently with routine cleaning and aims to reduce dust and soiling on low-touch surfaces.

"Sedimentation" The act or process of depositing sediment from suspension in water. The term also refers to the process whereby solids settle out of wastewater by gravity during treatment.

"Shallow Wells" Refer to a hole which has been dug, bored, driven or drilled into the ground for purposes of extracting water and is considered shallow if about 5 meters deep.[1]

"Sharps" Sharps are all objects and materials with puncture or cutting properties such as syringes with needles, blades and broken glass; and pose a potential risk of injury and infection. For this reason, sharps are considered as one of the most hazardous categories of Health Care Waste generated during procedures.

"Sluice Room" A dedicated room or area, separated into dirty and clean areas, where noncritical patient care equipment is reprocessed. Access is restricted to cleaning staff and authorized personnel.

"Soakaway Pit or Soak Pit" A simple excavation in the ground either lined or filled with stones, which allow water to percolate into the surrounding soil.

"Standard Precautions" A set of practices designed to prevent the spread of infection between health care workers and patients from contact with infectious agents in recognized and unrecognized sources of infection. Such precautions are recommended for use with all patients, regardless of patient diagnoses or presumed infectious status. Key elements include hand hygiene, cleaning of the environment, reprocessing of equipment between patients, use of personal protective equipment, placement of patients with known infection or colonization into isolation, laundry management, injection safety, preventing exposure to blood borne pathogens, waste management and respiratory hygiene

"Statute" Written law passed by a legislative body or rule of an organization or institution.

"Sterilization" A process that renders an object free from viable micro-organisms (germs) including viruses and bacterial spores. Used on reusable invasive medical devices such as theatre implements, some devices used in dentistry etc. It kills all living micro-organisms (germs). Examples of sterilisation methods include steam sterilisers and UV lights.

"Sustainable Sanitation" A system designed to meet certain criteria and work well over a long-term (It attends to all processes of the system: methods of

1 Technology Notes by Water Aid, Caroline Penn

collecting, transporting, treating and disposal or reuse of waste).

"Terminal (discharge) Cleaning" cleaning and disinfection after the patient is discharged or transferred. Includes the removal of organic material and significant reduction and elimination of microbial contamination.

"Two-bucket System (mopping)" Floor mopping system for cleaning only (not disinfection). One bucket contains a detergent or cleaning solution and the second bucket contains clean water for rinsing the mop.

"Village health teams" Are community volunteers who are selected by communities to provide correct health information, mobilize communities and provide linkage to health services.

"Visibly Soiled Hands" These are hands showing visible dirt or visibly contaminated with proteinaceous material, blood, or other body fluids (e.g. Blood, fecal material or urine)

"Waste Minimization" is the act of reducing the amount and toxicity of hazardous waste generated

"Waste Segregation" means to group waste into different categories

"Waste Sorting" is the process by which waste is separated into different elements

"Water" means drinking (potable) water whose quality complies with Uganda Standard US 201:2008 of the Uganda National Bureau of Standards

"Water Availability" sufficient and reliable quantities of safe water supplied throughout to meet all uses in HCFs

"Water Storage Tank" A container with specifications for storage of water for use

"Water Supply" Refers to the provision of water by urban or rural utilities, commercial organizations etc. usually via a system of pumps and pipes

"Water Treatment" Any process that makes water more acceptable for a specific end use

CHAPTER 1: **INTRODUCTION**

1.1. Background

Functional Water, Sanitation and Hygiene (WASH) services contribute to improved quality and safety of care leading to reduction in infectious diseases and associated mortality, improved occupational health, staff morale and performance, and increased trust in health care services. The result is the subsequent increase of health services uptake. There is also evidence that, infections related to poor hygiene in health facilities are a leading cause of mortality and morbidity of mothers and children. Equally, recent evidence links improve nutrition to WASH services – access to piped water and reduced open defecation are among factors that led to decline in stunting in Uganda. Additionally, lack of adequate WASH services may also discourage women from giving birth in health care facilities (HCFs) or cause delays in health care-seeking (Velleman et al, 2014). Local health facilities that have poor water and sanitation are likely to be a contributing reason that many women chose home deliveries over going to health facilities (where sanitary conditions may be similar or worse).

Primary health care facilities are often the first point of care in rural settings and play a key role in outbreak control, which is not possible without appropriate WASH facilities and prevention of contamination of water.

According to the 2019 Joint Monitoring Program Report, findings on WASH services in health facilities indicate that, 31 percent of health facilities in Uganda have basic water, 12 percent basic sanitation and 43 percent basic waste disposal.

In 2018, UNICEF carried out a WASH conditions assessment, including chemical and bacteriological parameters in the water supplied, in 139 healthcare facilities in Karamoja and West Nile Region. Generally, it was observed that most of the facilities have limited WASH services with hand washing facilities being the worst service provided.

For instance, in West Nile 85 percent of healthcare facilities had limited water supply due to lack of a reliable water source within their premises and relied mainly on rain water harvesting during the rainy periods. All (100 percent) of the healthcare facilities do not know of any written guidelines to guide the operation and maintenance (O&M) of WASH facilities. Only 2.4 percent of the healthcare facilities had a sufficient annual budget for O&M, 14.6 percent used only internally generated facility revenues for O&M and only 20 percent had adequate staff for O&M activities. Finally, 40.6 percent of the healthcare facilities had a functional WASH management committee.

In Karamoja, 70 percent of the health facilities had limited water supply, 92 percent had limited sanitation facilities for instance latrines were insufficient and un hygienic, 80 percent had limited

hand hygiene with no soap, water and some were non-functional. 63 percent had no written guidelines on O&M and, 5.5 percent had a functional WASH management committee. Only 2 percent of the HCFs had a sufficient annual budget for O&M, 14 percent used only internally generated facility revenues for O&M and 60 percent had adequate staff for O&M activities.

Similarly, in a study done by WaterAid in 2019 together with partners among 63 health care facilities in central Uganda, revealed that 48.1 percent of the health care facilities did not have access to a reliable and safe water supply; 85.2 percent did not have safe and private toilet facilities; 51.9 percent were visibly unclean, 57.4 percent did not have adequate hand hygiene facilities while 53.7 percent did not have an efficient health care waste management system. Access to a reliable and safe water supply was mainly affected by the level of health care facility, with hospitals and health centre IVs having a more reliable and safe water supply compared to health centre IIIs. 69.2 percent had annual planned budgets for the healthcare facility that includes funding for WASH infrastructure; only 61.5 percent had a dedicated infection control focal person or committee; 62.0 percent had written guidelines pertaining to WASH for the healthcare facility; and 36.9 percent had staff responsible for cleaning the delivery room receiving training in the last 24months.

WASH in health centers is one of the neglected issues, as indicated in the assessment conducted by UNICEF with partners in 2018 and the WaterAid study (2019) covering West Nile and Karamoja. It was noted that majority of the health centers had limited WASH services with hand washing facilities being the worst service provided. Therefore, WASH interventions are required to address gaps identified in health care facilities.

In 2017, Water for people together with partners carried out a study on evaluation of water, sanitation and hygiene in healthcare facilities in Kamwenge district in western Uganda. Of the 63 HCFs visited only 14 (23%) had the exterior adequately fenced with 55% having exteriors free of solid waste and 85% with no visible standing water. Of 62 health facilities, 4 (6%) had district or Ministry of Health guidelines for WASH, 15 (24%) for waste disposal, and 11 (18%) for infection prevention and control (IPC). Thirty-seven (60%) HCFs held trainings for new staff members in IPC and 34 (55%) assigned IPC responsibility to an individual, including a nurse in 40% of HCFs and the in-charge or clinic director in 21%. The main water sources in 54 (87%) of 62 HCFs were improved, including boreholes in 14 (23%), rainwater collection in 13 (21%), a piped water connection in 12 (19%), and a public standpipe in 6 (10%). 30 (48%) of the HCFs had the main water source was located off the premises with a median roundtrip time to collect water of 30 minutes (range 0-90 minutes). Sixteen (37%) of 43 source water samples yielded E.coli, while eight (19%) had turbidity levels >5 NTU. At least one handwashing station was reported in 55 (92%) HCFs, 47 (78%) had 1-4, and 8 (13%) HCFs had ≥5. Of 113 observed handwashing stations, 100 (88%) had water available, and 64 (57%) had soap. The most common type of handwashing station observed was a covered container with a tap (54%). Sinks were noted at 22% of observed handwashing stations. Drinking water was reported to be available to staff/patients at 32 (51%) HCFs; 33 (53%) of 62 HCFs reported separating sharps, infectious waste, and non-infectious waste; Eight (15%) of 62 HCFs used an improved site for sharps disposal (either an incinerator or lined pit for burning). 59 (95%) HCFs reported disposing of infectious waste on premises,

including 58 (98%) which used burning; 8 (14%) used an improved disposal site (incinerator or lined pit). Noninfectious waste was disposed of and burned onsite in all HCFs but only 6 (10%) HCFs used an improved disposal system. All HCFs had latrines on site. Separate facilities for patients and staff was reported for 34 (55%) HCFs. Handwashing stations were available within 5 meters of 66 (30%) out of 197 patient latrines. Latrines were separated by gender in 18 (30%) HCFs.

The provision of water, sanitation and hygiene (WASH) in health care facilities serves to prevent infections and spread of disease, protect staff and patients, as well as uphold the dignity of vulnerable groups of people such as pregnant women and the disabled (WHO: 2015) and also the elderly.

Absence of guidelines in the provision of WASH services in health care facilities leads to inconsistencies especially in regard to planning, budgeting, designing, construction, operation, maintenance, monitoring, and evaluation for continuous quality control and sustenance.

The aim of developing these guidelines is to offer epigrammatic instructions to the different stakeholders at all levels of service while addressing the various WASH related interventions in HCFs, so as to standardize all approaches within means (taking into consideration all the regional variations), during implementation and monitoring of activities for continuous improvement, and to enable efficient utilization of all the enormous resources.

1.2. Global Overview of WASH in HCFs

Globally provision of WASH in HCFs is an obligation and no longer a luxury. Whereas it was found to be below expected coverage in a study conducted by WHO in 2015, not much has improved to date. Generally, in some circles it's referred to as a 'forgotten cousin' because it is not accorded the attention it deserves yet it plays a crucial role in health, socio-economic and developmental vitality. Most affected are the low- and mid-income countries where many factors contribute to the compromising positions, posing serious adverse effects to the health care workers, patients, caregivers and the environments served. Across the globe, there are many new and re-emerging pathogens spreading quickly around the globe to major cities in as little as 36 hours, resulting into epidemics and outbreaks that can potentially overwhelm health systems and devastate economies, if not cabbed with appropriate use of simple means as WASH.

According to a survey conducted by Water Aid (in 2012), hand hygiene compliance among health care workers was approximately 40 percent in the developed world compared to 2.1 percent among the developing countries.

Several other studies done by WHO and UNICEF in 2015 also revealed inadequate provision of essential WASH services particularly improved sanitation, water and soap for hand washing and basic facilities for basic human excreta disposal.

As a measure to improve the status quo, several global health initiatives e.g. integrated global action plan against pneumonia and diarrhoea, quality care during child birth and every woman,

every child has been highlighted to emphasize the importance of WASH services in HCFs. WHO and UNICEF in collaboration with several development partners worldwide have dedicated time and resources to implement a global action plan with five change objectives to address health and safety, disease prevention and treatment, staff morale and performance, people centered care, community WASH, health care costs, climate change and disaster resilience basing on a vision which states:

> *"To ensure that by 2030 every healthcare facility in every setting has a safely managed reliable water, sanitation, hygiene facilities and practices to meet staff and patient needs in order to provide quality, safe people centered care with particular attention to the needs of women, girls and children".*

1.2.1. WHO Minimum Health Standards in HCFs

As an additional measure to mitigate risks of acquiring HCAIs and elevate political involvement in terms of adopting implementable policies and strategies, minimum WASH standards in health care facilities were set by WHO for countries to adopt or set their own. Furthermore, the WHO Director General declared that improving WASH in HCFs was an urgent priority. The minimum standards set included, among others;

i) Water accessibility and availability
ii) Water quality and quantity
iii) Water facilities
iv) Human excreta disposal management
v) Healthcare waste disposal management
vi) Waste water treatment and disposal
vii) Cleaning and laundry
viii) Food storage and preparation
ix) Building design, construction and management
x) Control of vector borne diseases
xi) Information and hygiene promotion

1.3. Purpose and Scope of the Guidelines

Functional Water, Sanitation and Hygiene (WASH) services contribute to improved quality and safety of care leading to prevention, reduction and control of infectious diseases and associated mortality, improved occupational health, staff morale and performance, and increased trust in health care services. Infections related to poor hygiene in health facilities are a leading cause of mortality and morbidity of patients, healthcare workers and visitors to the healthcare facilities.

These WASH guidelines provide a framework for strategic planning and implementation of functional and effective WASH facilities and services in healthcare facilities in Uganda.

These guidelines offer a basis of creating the minimum conditions required for providing healthcare services in a healthy environment for healthcare workers, patients and visitors to the healthcare premises.

The WASH guidelines also serve as a tool for monitoring the performance of WASH in health care facilities.

The Guidelines mainly focus on the following elements:

- Minimum requirements for WASH in health care institutions;
- Planning and budgeting;
- Water facilities/services;
- Hygiene facilities and information on hygiene promotion;
- Infection, prevention and control;
- Sanitation facilities / excreta disposal and drainage including faecal sludge management;
- Health-care and solid waste management;
- Hand hygiene;
- Cleaning of surfaces;
- Laundry;
- Food storage and preparation;
- Vector and vermin control;
- Operation and maintenance of WASH facilities;
- Monitoring, evaluation and reporting;
- Health worker practices;
- Landscaping and gardening;
- Regulation and consequences in case of non-compliance.

These guidelines have been scoped from WHO standards, international and national guidelines on WASH /IPC, best practices and bench marking.

1.4. Rationale for Developing the Guidelines

The rationale for developing the guidelines is for documented procedures for provision of adequate water supply, sanitation, hygiene and waste management in HCFs for the achievement of positive effects, namely:

- Enhanced infection prevention control in HCFs among patients, healthcare workers, staff and visitors to the HCFs;
- Healthy environment offers psychological comfort for acceptability of healthcare services at HCFs;

- HCF users can learn and practice positive hygiene behaviors;
- Increased up-take of the healthcare services;

The absence of guidelines in the provision of WASH services in HCFs leads to lack of uniformity especially with respect to planning and budgeting, technical designing and construction, O&M, quality control and monitoring of such interventions.

1.5. Users of the guidelines

These guidelines have been developed for use by the health managers and planners, health development partners, consultants, contractors, public and private health workers, health promoters and other health sector stakeholders.

1.6. Objectives of the guidelines

The overall objective of these WASH guidelines is to put in place a uniform and harmonized approach in the provision of WASH services in public and private HCFs across the country.

Guidelines provide a standard approach to guide stakeholders in addressing WASH challenges in health institutions in the country and to provide practical guidance for planning, budgeting, designs and specifications of recommended WASH facilities, operation and maintenance and monitoring of the performance of the services.

Guidelines institute systems to keep track of standards in public, Private not for profit (PNFP) and private HCFs all over the country, in a more uniform and coordinated approach for continuous quality improvement and sustainability, in order to mitigate risks associated with inappropriate function of WASH /IPC facilities in Uganda.

1.7. Healthcare Facility Categories

1.7.1. Service Delivery by Level of Health Facility

Uganda's health facilities are classified into seven levels based on the services they provide and the catchment area they are intended to serve. The health facilities are designated as Health Centre level one (HC I) to Health Centre Level four (HC IV); General hospital, Regional Referral hospital and National Referral hospital. The respective services provided at each of the levels and the desired catchment area / populations are as in Table 1-1. The Special clinics are health facilities with specialized services provided e.g. TASO Sites offer HIV related services only.

Table 1.1: Service Delivery by Level of Health Facility

Level	Population Served	Services provided
Clinic	Not defined	Community based preventive and promotive health and nutrition services, Village Health Community or similar status.
Health Center II	5,000	Preventive and promotive and outpatient curative health services and outreach care
Health Center III	20,000	Preventive, promotive and outpatient curative, maternity and inpatient health and nutrition services and laboratory services.
Health Center IV	100,000	Preventive and promotive and outpatient curative, maternity, inpatient health and nutrition services, emergency surgery, blood transfusion and laboratory services
General Hospital	500,000	In addition to services offered at HCIV level, other general services are provided, including in-service training, consultation and research for community-based health and nutrition care programmes
Referral Hospital	1,000,000	In addition to services offered at the general hospital each hospital will offer a package of specialised services and training.
Regional Referral Hospital	2,000,000	In addition to services offered at the general hospital, specialist services will be offered, such as psychiatry, Ear, Nose and Throat (ENT), Ophthalmology, dentistry, intensive care, radiology, pathology, higher level surgical.
National Referral Hospital	10,000,000	These provide comprehensive specialist services. In addition, they are involved in teaching and research.

Source: National Health Facility Master List 2018

1.7.2. Summary of Health Facilities Ownership

A total of 6,937 Health facilities and special clinics from 128 districts are included in the National Health Facility Master List of 2018. 45.16 percent (3,133) of the health facilities are Government owned, 14.44 percent (1,002) are Private and Not For Profit (PNFP) while the remaining 40.29 percent (2,795) are Private For Profit (PFP) and 0.10 percent (7) are community-owned facilities. The Government and PNFPs are mostly higher levels of health facilities while the Private For Profit facilities majorly consists of lower levels (HC IIs and clinics). There are 2 National Referral Hospitals, 13 Regional Referral Hospitals, 3 Referral Hospitals, 163 General Hospitals, 222 Health Centre IVs, 1,574 Health centre IIIs, 3,365 Health Centre IIs, 1572 Clinics and 23 Special Clinics

from TASO, AIDS Information Centre (AIC) and Children's AIDS Fund Uganda (CAFU) (See Table 1-2 and Figure 1-1)).

Table 1.2: Summary of health facility levels

Level	Count	Percentage
Clinic	1578	22.75%
Health Center II	3364	48.49%
Health Center III	1569	22.62%
Health Center IV	222	3.20%
General Hospital	163	2.35%
Referral Hospital	3	0.04%
National Referral Hospital	2	0.03%
Regional Referral Hospital	13	0.19%
Special Clinics	23	0.33%

Source: National Health Facility Master List 2018

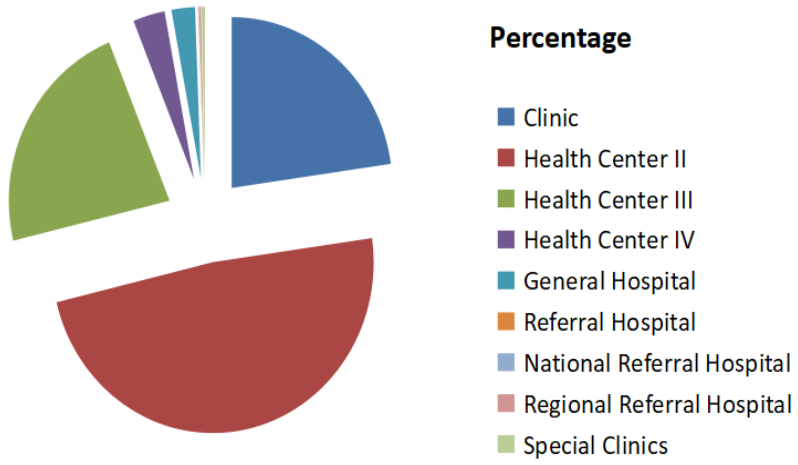

Figure 1.1: Healthcare Facility Levels in Uganda

1.8. Structure of the guidelines

The guidelines are comprised of three parts as follows;

- Part 1 - The full volume of the guidelines
- Part 2 - Appendices

CHAPTER 2: **LEGAL, POLICY AND REGULATORY FRAMEWORK**

2.1. Introduction

These guidelines for WASH in health care facilities are governed by the Constitution and the laws of the Republic of Uganda. They are subject to and are to be administered under the prevailing legal, policy and regulatory framework of the republic of Uganda. In case of ambiguity and / or conflict with any provisions, the policies and laws that are in force shall prevail.

This chapter gives a summary of legal, policies and regulatory framework for WASH in HCFs. The policies reflect on social transformations as outlined in the Uganda Vision 2040. In particular, the Uganda Vision 2040 intends to improve the quality of its population health and nutrition status, water and sanitation conditions. It also seeks to improve the health, sanitation and hygiene by constructing and extending piped water supply and sanitation systems to all parts of the country.

The following national policies, strategies and legislations have been have been taken into consideration in the drafting of the guidelines. The guidelines shall be reviewed and amended as deemed necessary by the Ministry of Health in case of change in legislation and applicable policies and regulations.

i. The 1995 Constitution of the Republic of Uganda
ii. The Public Health Act, 2000
iii. The National Environment Act, 2019
iv. The Occupational Safety and Health Act, 2006
v. The Amended Water Act, 1997 CAP 152
vi. The Local Government Act, 1997
vii. The Land Act
viii. The National Development Plan (NDP III) 2021/2022 – 2024/2025
ix. The Water Environment Sector Investment Plan 2018 -2030
x. The Health Sector Development Plan (HSDP) 2015/16 – 2019/20
xi. Ministry of Water and Environment Sector Development Plan, 2015/16 – 2019/20
xii. The Second National Health Policy (NHP II), 2010
xiii. The National Environmental Health Policy, 2005

xiv. Injection Safety and Healthcare Waste Management Policy, 2018

xv. The National Environmental Management Policy, 2014

xvi. National Hospital Policy, 2006

2.2. The Existing Legislation

2.2.1. The 1995 Constitution of the Republic of Uganda (as variously amended)

In Objective XIII, the Constitution requires the state to protect important natural resources including land, water, wetlands, minerals, oil, fauna and flora on behalf of the people of Uganda.

Objective XXI requires the state to take all practical measures to promote a good water management system at all levels.

Under Objective XXVII, the state shall promote sustainable development and public awareness of the need to manage land, air, water resources in a balanced and sustainable manner for the present and future generations.

Under Article 39 the Constitution of the Republic of Uganda entitles every citizen to a clean and healthy environment.

2.2.2. The Public Health Act, 2000

The Act provides for prevention of diseases to the public arising from sewerage, poor sanitation and pollution of the environment. It regulates the use of chemicals for public health and sets up the Health Inspectorate to ensure compliance. It also sets up the drainage and sanitation rules which specifically mention technical aspects of waste disposal. It gives guidance on waste management in general.

Section 105 of the Public Health Act imposes a duty on the local authority to take measures to prevent any pollution dangerous to health of any water supply which the public has a right to use for drinking or domestic purposes.

2.2.3. The National Environment Act, 2019

The Act prohibits the discharge of hazardous substances into any part of the environment except with the guidance of the National Environment Management Authority.

It also prohibits pollution contrary to established standards; prohibits the illegal traffic of hazardous wastes and gives any person generating hazardous wastes the duty of the management of his wastes.

The National Environment Act, CAP 153 requires NEMA in consultation with lead agencies to establish environment standards. Currently, many environmental standards have been prescribed and some of the relevant ones include;

The National Environment Waste Management Regulations - 1999 which require a person who owns or controls a facility or premises which generate waste to minimize the waste generated by adopting cleaner production methods. They also offer guidance on application for a license to transport or store waste, license to operate a waste treatment plant and other requirements for waste in general. The regulations, however, do not explicitly address the area of healthcare waste management, but the all encompassing provisions remain applicable.

2.2.4. The Occupational Safety and Health Act, 2006

Article 13 (1) of this Act states that it is the duty of employers to take as far as possible all measures to protect their workers and the general public from dangerous aspects of the employer's undertaking at their own cost.

The employer should ensure that the working environments are clean and kept free from hazards due to pollution.

Article 19 (1) states that the employer should provide protective gear where the level of air pollution and chemical substances in a working environment exceed the exposure limits specified by an occupational health specialist, an employer shall provide adequate and suitable protective clothing and protective equipment to the workers of his or her undertaking.

It shall be the duty of an employer to ensure that personal protective equipment provided under subsection (1) is used whenever it is required.

2.2.5. The Amended Water Act, 1997 CAP 152

Among the objectives of the Act are:

- To promote the provision of a clean, safe and sufficient supply of water for domestic purposes to all persons; and
- To control pollution and to promote the safe storage, treatment, discharge and disposal of waste which may pollute water or otherwise harm the environment and human health.

2.2.6. The Local Government Act, 1997

The Local Governmental Act, 1997 allocates responsibility for service delivery of a number of functions to Local Government Councils (Districts/Cities/Municipalities/Towns) and to lower Local Government Councils (Sub-Counties/Divisions). These functions include water services and sanitation.

2.2.7. The Land Act

This act provides that all rights in the water of any natural spring, river, stream, watercourse, pond, or lake on or under land, whether alienated or unalienated, shall be reserved to the Government; and no such water shall be obstructed, dammed, diverted, polluted or otherwise

interfered with directly or indirectly, except in pursuance of permission in writing granted by the minister responsible for water or natural resources in accordance with the Water Act.

2.3. Related National Strategies

2.3.1. The National Development Plan (NDP III) 2021/2022 – 2024/2025

The National Development Plan III aims among other human capital interventions, at improving population health, safety and management by increasing access to inclusive safe water, sanitation and hygiene with emphasis on widening coverage of improved toilet facilities and handwashing practices. This would be achieved by Investing in effective management of the entire WASH value chain segment such as containment, emptying, transportation, treatment, safe reuse or disposal.

2.3.2. The Water and Environment Sector Investment Plan 2018 - 2030

The Water and Environment Strategic Sector Investment Plan builds upon lessons and experiences learned during implementation of the National Development Plans, with a focus on improvement of service delivery for social economic transformation and a healthy, clean and productive environment among others, which in the long run leads to achieving sustainable development in the sector through an efficient use of water resources and efforts to increase the availability of water and sanitation services.

2.3.3. The Health Sector Development Plan (HSDP) 2015/16 – 2019/20

The HSDP goal is to accelerate movement towards universal health coverage with essential health and related services needed for promotion of a healthy and productive life. Thus, the plan sets key objectives to be attained during the 5-year period. These include:

(i) Contributing to the production of a healthy human capital for wealth creation through provision of equitable, safe and sustainable health services;

(ii) Increasing financial risk protection of households against impoverishment due to health expenditures;

(iii) Addressing the key determinants of health through strengthening intersectoral collaboration and partnerships.

In order to achieve these objectives, the health sector will work towards strengthening the national health system including governance; disease prevention, mitigation and control; health education and promotion, curative services; rehabilitation services; palliative services; and health infrastructure development.

2.3.4. Ministry of Water and Environment Sector Development Plan, 2015/16 – 2019/20

MWE sector development plan sets the key sector priorities and interventions for the period 2015 – 2020 in line with the Vision 2040 and sustainable development goals (SDGs).

The plan seeks to increase access to safe water in rural and urban areas to 79% and 100% respectively ensuring that each village has a safe water source, increasing sanitation and hygiene levels in rural and sewerage coverage in urban areas to 95%; increasing functionality of water supply systems and promote catchment based integrated water resources management.

Amongst the strategies is promotion of improved sanitation and hygiene practices in households, communities and rural growth centers in order to reduce the number of deaths and illness related to poor sanitation. The priority interventions include promotion of WASH humanitarian preparedness and response to avert possible outbreaks of water related diseases.

2.3.5. The Uganda Nutrition Action Plan (2020-2025)

The goal of the nutrition action plan is to improve the nutrition status of children under 5 years, school age children, adolescents, pregnant and lactating women and other vulnerable groups by 2025.

Promotion of access to nutrition sensitive WASH services is one of the key strategy actions with priority of:

(i) Increase provision of adequate safe drinking/potable water sources in communities, institutions and public places.
(ii) Increase household and community access to sanitation and hygiene services
(iii) Mobilise communities on sustainable use of WASH services.
(iv) Promote integration of messaging on hand washing, hygiene practices, safe food preparation and storage with MIYCAN sensitization.
(v) Support provision of adequate water for production of nutrient dense and safe food.

2.4. Related National Policies

2.4.1. The Second National Health Policy (NHP II), 2010

The focus for the NHP II was on health promotion, disease prevention and early diagnosis and treatment of disease with emphasis on vulnerable populations.

Under Section 6.2 of the policy document, the minimum health care package in Uganda shall consist of the most cost-effective priority healthcare interventions and services addressing the high disease burden that are acceptable and affordable within the total resource envelope of the sector. The package consists of the following clusters:

a) Health promotion, environmental health, disease prevention and community health initiatives, including epidemic and disaster preparedness and response;
b) Maternal and Child Health;
c) Prevention, management and control of communicable diseases;
d) Prevention, management and control of non-communicable diseases.

2.4.2. The National Environmental Health Policy, 2005

The objective of this policy is to create an enabling environment for the achievement and maintenance of healthy living conditions in rural and urban areas. The policy establishes the environmental health priorities of the government of Uganda and provides a framework for development of services and programmes at national and local government levels.

2.4.3. Injection Safety and Healthcare Waste Management Policy, 2018

The policy sets out strategies for ensuring that patients, health workers, communities are protected from risks associated with unnecessary and unsafe injections. The policy also provides guiding principles for safe injection practice and proper management of all health care waste. Under Policy 4.0 - Health Care Waste Management, the policy states that:

a) Every health facility shall have someone in-charge of health care waste management;
b) Waste management guidelines shall be made available to health workers;
c) All health workers will follow waste guidelines as elaborated in the national infection prevention and control guidelines;
d) Health care waste shall be segregated at the source into pre-colour coded containers;
e) Sharps shall be collected into secure sharps containers or safety boxes immediately after use;
f) Sharps boxes will be disposed of when three quarters full;
g) The recommended final disposal method is incineration, where incinerators are not available; the sharps containers shall be burnt followed by burying.

2.4.4. The National Environmental Management Policy, 2014

The overall policy goal is sustainable development which maintains and promotes environmental quality and resource productivity for socio-economic transformation.

One of the key policy objectives is to promote long-term, socio-economic development for improved health and quality of life through sound environmental and natural resource management.

Under this section, one of the key principles is that every person has a constitutional right to live in a clean and healthy environment and the obligation to keep the environment clean, safe and productive.

2.4.5. National Hospital policy, 2006

The national hospital policy is soft law which was established to guide the operations of the hospital sub-sector that includes public, NGOs, PNFPs and private hospitals by setting terms of reference for accreditation, which is a voluntary quality assurance mechanism. This can be used as an incentive in the acceptance, compliance and implementation of WASH in HCFs.

2.5. Relation to National Standards and Codes

These guidelines are intended to support and complement existing national standards and codes and do not modify or substitute for them. Users of these guidelines should attempt to locate relevant national standards through their respective government ministries and institutions, organizations, professional bodies and training institutions.

2.6. Institutional framework

2.6.1. National Level

For functional and sustainable WASH services in HCFs, it is important to identify the main actors who are involved and clarify their roles and responsibilities. At national level, WASH services are coordinated by MOH as the lead ministry. Table 2-1 presents the roles and responsibilities of the main actors at national level.

Table 2.1: Roles and Responsibilities of the Main Actors for WASH at National Level

Organization	Roles and responsibilities
Ministry of Health	• Responsible for the health of the population • Development and coordination of policies, strategies, guidelines, legislation and regulation • Development, monitoring and supervision of health care services • Development, of health care facilities • Development and implementation of health care waste management plans and standard operating procedures • Capacity building and healthcare facilities assessment • Regulation of public health standards
Ministry of Local Government	• Monitoring health care services in local governments
Ministry of Water and Environment	• Water resources management, rural and urban water supply development, water supply and sanitation regulation.
Ministry of Finance, Planning and Economic Development	• Provision of funds for the development of health care facilities • Provision of funds for the development of WASH facilities in health care facilities

Organization	Roles and responsibilities
Ministry of Public Service	• Recruitment of health care workers and staff
Office of the Prime Minister	• To ensure efficient and effective implementation of Government Policies, Programs and Projects. • Harmony, consistency and synergy in implementation of Government Policies. • Regulate, provide and Coordinate information about implementation of public policies, programmes and projects.
District Local Government	• Supervision of health care services in the district • Enforcement of public health standard in the district • Planning and development of WASH facilities in health care facilities • Promotion of WASH programmes in the district
Kampala Capital City Authority	• Development of health care facilities • Provision of health care services in Kampala Capital City • Enforcement of public health standards in Kampala Capital City
Development Partners and Non-Governmental Organizations	• Support provision and development of health care services • Support development of WASH infrastructure in health care facilities

2.6.2. Hospital Management Boards and Hospital Management Committees

Hospital Management Boards and committees are the key governance structures. These promote participation and ownership of health services by the community, advocate for improved quality of service delivery, and promote transparency in management of human, material and resources. The establishment of the boards is in pursuit of one of the policy objectives of the Second National Health Policy which is to ensure that communities are empowered to play their role, take responsibility for their own health and ensure that they actively participate in the design, planning and management of health services.

All boards have the capacity to decide and mobilize resources to strengthen WASH services in HCFs. Roles and responsibilities are as presented below:

(i) Provide strategic direction for the hospital within the framework of the Health Policy.

(ii) Review and approve the strategic plans, annual recurrent and development work plans, budget and any necessary reallocations within the budget as presented by management, for submission to Ministry of Health.

(iii) Discuss and approve the hospital annual report before it is submitted to the Permanent Secretary, Ministry of Health.

(iv) Oversee the procurement, storage and utilization of all hospital goods and services as well as essential medicines and health supplies.

(v) Provide oversight in the management of human resources for health including: attraction, development, motivation, attendance to duty, performance, retention, and exit.

(vi) Oversee proper sanitation and good hospital environment for effective health services delivery.

(vii) Monitor the proper security of all the hospital assets including land.

(viii) Promote and improve communication between the hospital and the public and foster community participation in hospital activities.

(ix) Mobilize resources for the hospital.

(x) Receive the internal and external audit reports.

2.6.3. Health Unit Management Committees

Health Unit Management Committees are key governance structures for HCIVs to HCII. The purpose of the committees is to strengthen the management and governance of Health Centers for improved service delivery.

The Health Unit Management Committee shall have nine members, three of whom shall be women with a minimum academic qualification of Ordinary Certificate of Education (UCE) for Health Centre IIIs[2] and Uganda Advanced of Education (UACE) for HCIVs[3] and not holding any political position.

The roles and responsibilities of the committees include:

(i) Provide strategic direction for the health centre within the framework of the Health Policy.

(ii) Review and approve the work plans, budgets and any necessary reallocations within the budgets as presented by management.

(iii) Discuss and approve the health facility annual report before it is submitted to the Chief Administrative Officer or Town Clerk.

(iv) Oversee the procurement, storage and utilization of all health facility goods and services as well as essential medicines and health supplies.

(v) Provide oversight in the management of human resources for health including: attraction, development, motivation, attendance to duty, performance, retention, and exit.

(vi) Oversee proper sanitation and good health facility environment for effective health services

(vii) Monitor the proper security of all the health facility assets including land.

2 Guidelines for Health Center III Health Unit Management Committees, 2019
3 Guidelines for Health Center IV Health Unit Management Committees, 2019

(viii) Promote and improve communication between the health facility and the public and foster community participation in health facility activities.

(ix) Mobilize resources for the health facility.

2.6.4. At the Healthcare Facility

The roles and responsibilities of the facility in-charge, the health workers and waste managers are presented in the Table 2-2.

Table 2.2: Roles and Responsibilities of the Facility In-charge, Health workers and Waste Management Officer

Organization	Roles and responsibilities
Facility in-charge	• Plan and budget for waste management and supplies including bins, bin liners, safety boxes as well as transport and final disposal; • Continuous training on topics related to HCWM, occupational health and safety, food hygiene, capacity building, and supportive supervision to health workers and waste management officer; • Master the art and implement colour coding and segregation; • Ensure compliancy to national policies; • Provide personal protective equipment for health workers and waste managers; • Ensure adequate supplies for waste collection, storage, treatment, and disposal are provided; • Organize weekly review meetings; • Ensuring sanitization of beds and change of bed linen in between patients; • Participate in staff induction and refresher training in the handling and treatment and disposal of health-care waste; • Liaise with department heads to ensure coordination of training activities, and decide what to do about waste management issues specific to particular departments; • Ensuring menstrual hygiene management disposal facilities are in place.
Health Workers	• Follow colour coding in waste segregation systems and ensure segregation at points of generation • Sterilize all infectious wastes before disposal • Dispose of all types of wastes in their appropriate containers immediately • Report all risks to facility in-charge • Sanitize appropriately every after segregation • Participate in weekly meetings as stipulated in facility WASH/ IPC committee regulations • Practicing hand hygiene at critical times i.e before touching the patient, before clean/aseptic procedure, after body fluid exposure, after touching a patient and after touching patient surroundings.

Organization	Roles and responsibilities
Waste Management Officer	• Responsible for developing the health-care waste-management plan • Responsible for the day-to-day operation and monitoring of the waste-disposal system • Control internal collection of waste containers and their transport to the central waste-storage facility of the HCF on a daily basis; • Liaise with the supplies department to ensure that an appropriate range of bags and containers for health-care waste, protective clothing and collection trolleys is available at all times; • Ensure that facility attendants and ancillary staff immediately replace used bags and containers with the correct new bags or containers; • Directly supervise hospital attendants, ancillary workers and waste handlers assigned to collect and transport health-care waste; • Ensure the correct use of the central storage facility for health-care waste, which should be kept locked but should always be accessible to authorized hospital staff; • Prevent all unsupervised dumping of waste on the hospital grounds; • Coordinate and monitor all waste-disposal operations; • Monitor methods of transportation of wastes both onsite and offsite, and ensure that wastes collected from the hospital are transported by an appropriate vehicle to the designated treatment and disposal site; • Ensure that waste is not stored for longer than specified in the guidelines and that the transport organization (which may be the local authority or a private contractor) collects the waste with the required frequency; • Ensure that waste handlers are properly trained in waste collection and treatment, as well as safe and sufficient disposal methods, including how to operate and maintain machines and technology; • Ensure compliance with occupational health measures, including current practices for post-exposure prophylaxis, as well as the provision and use of personal protective equipment for health workers and waste handlers. • Liaise with department heads to ensure that all health workers are aware of their own responsibilities regarding waste segregation, and storage and closing and sealing of waste bags, to minimize infection risks; • Ensuring there are special bins for menstrual hygiene management in gazzetted places;

CHAPTER 3: **WATER SUPPLY FACILITIES**

3.1. Introduction

The availability of clean water in health facilities is critical to providing quality healthcare. Workers in health care facilities need sufficient quantities of safe water to provide health care services. Drinking and cooking, hand hygiene, showering and bathing, and a variety of general and specialized medical uses all require safe and reliable supplies of water. Water is also essential for cleaning rooms, beds, floors, toilets, sheets and laundry. It is central to patient experiences of health care, as it enables them to remain hydrated, to clean themselves, and to reduce the risk of infections.

3.2. Objective

NDP III aims at improving population health, safety and management. Among the interventions to be taken to achieve this is through increasing access to inclusive safe water and sanitation. In line with this objective, this chapter seeks to give direction in planning and provision of quality, reliable, accessible and adequate water supply for use in the HCFs. Adequacy of water should be in terms of quantity, quality, reliability and accessibility.

3.3. Source of Water Supply

The following are the recommended sources of water in HCFs singly or in combination depending on the assessment of the available water resources.

- Rainwater
- Ground water – protected springs, hand pumped boreholes or powered boreholes
- Surface water - Piped water supply from public utility service

3.4. Water Supply System Technologies

HCF water supply system components to include the following:

- Point water
    - Protected spring
    - Hand pump borehole

- Powered borehole system
    - Solar power system
    - Grid power supply
- Piped water system
    - Service connection from public water mains
    - Dedicated water storage tank
    - Site water distribution pipe network
- Water trucking

3.5. General Selection Considerations for Suitable Water Source

The selection of a suitable source or combination of sources of water is one of the initial steps in designing a water supply scheme. The source or sources must be capable of supplying sufficient water of acceptable quality for the scheme.

The selection of the most suitable water source involves taking into account a number of general factors as follows:[4]

i. **Quantity:** Is the quantity of water available at the source sufficient to meet present and future demand? Water extraction permits from the Directorate of Water Resources Management in Entebbe are required for water abstraction in Uganda.

ii. **Quality:** Is the raw water quality such that, water which meets the quality standards specified in the subsequent sections of this guideline. Drinking water sources must meet the minimum WHO water quality standards.

iii. **Cost:** Are the capital as well as the operation and maintenance costs of the source acceptable?

iv. **Technology:** Is there appropriate technology and expertise to exploit and maintain the source of water and associated water treatment and transmission facilities?

v. **Protection:** Can the water source be protected from present and future pollution and contamination and can the catchment area be protected effectively to ensure the sustainability of the quantity and quality of the raw water?

3.6. Connection to Existing Water Supply System

It is recommended that healthcare facilities located close to piped water supply systems either operated by national water and sewerage corporation (NWSC) or umbrella organization (UO) should apply for a connection to ensure reliable water supply. Due to interruptions in the water supply due to breakdowns or maintenance works, healthcare facilities should have backup storage facilities with a two days water demand capacity. While NWSC or UO will provide extension of

4 Ministry of Water and Environment Water Supply Design Manual, 2013

pipes to the premises, HCFs will have to contract out the services of water reticulation pipework within the facility and installation of the storage facilities to local water technicians or plumbers.

3.7. Development of Self-supply Water Systems

Healthcare facilities located in areas where there is no piped water supply systems operated by national water and sewerage corporation (NWSC) or umbrella organization, will have to develop their own water sources. i.e protected shallow wells and springs, boreholes.

3.7.1. Springs

A spring can be defined as a place where rock or clay layers block the flow of underground water, forcing it upwards where the outflow emerges in the open at the ground surface. To locate good springs and to get information about their reliability especially during drought periods the designer should consult the local people resident in the area.

To measure the yield of springs identified as potential sources for a water supply scheme, simple devices such as over-flow weirs and V-notches should be installed. Spring yield is measured in litres per second (l/s).

3.7.1.1. Spring Protection

Springs should be protected to prevent contamination by surface water. The ground acts as a bacterial filter making spring water a reliable water source.

The following points should be considered when investigating a potential spring source:

- Ensure the spring is not really a stream which has gone underground and is re-emerging;
- Ensure the source and the collection area are not likely to be polluted by surface run-off;
- Check that there are no latrines within 30 metres, particularly upstream of the spring;
- Fence the area around the spring tank to prevent pollution by children or livestock;
- Make sure that, if the spring is to be connected to a piped water system, it is on higher ground than the area to be supplied so the water will flow by gravity; and
- Take care that the spring tank is not built on swampy ground or on land which is subject to erosion or flooding and that the flow from the protected spring itself will not cause erosion or damage.[5]

To protect a spring the following steps are followed:

i. Clean up the whole site by digging drainage trenches;

5 Technical brief on Protection of spring sources by WaterAid

ii. Place a layer of hardcore over which is an impervious clay layer; The spring water is collected and channelled to the discharge pipe in a concrete wall through a gravel layer;

iii. Spring water is collected and channelled through a gravel layer to the discharge pipe in the concrete wall. The pipe is located at a convenient height to enable villagers to fill their containers;

iv. An impervious clay layer is used above and around the spring to restrict surface seepage. A drainage channel is dug to channel away storm water and a concrete paved access provided to enable users to easily fill containers; and

v. A fence may be built to keep livestock out and the grass surrounding the spring kept well-trimmed.

Common materials are used in the construction of springs: Stones, aggregates and sand are obtained locally and cement used ordinary Portland cement. The walls may also be built from local stone by skilled "Fundis" minimizing the use of cement hence lowering the cost.

Advantages of spring protection schemes:

- *Water coming naturally to the surface limits need for pumping*
- *Low maintenance and running costs*
- *Can be high yielding source of good quality – no need for treatment*

Disadvantages of spring protection schemes

- *Yield can diminish or dry up during extreme drought periods*
- *Regular maintenance needed around the spring head to prevent pollution*

3.7.1.2. Operation and Maintenance of springs

Maintaining the integrity of the protective spring structure is important to ensure the risks from surface and subsurface contamination entering the spring are minimized. Where a spring box needs cleaning or maintenance work, standard operating procedures should be followed to ensure contaminants are not introduced into the spring during the work.

The following aspects have to be checked during regular visits to the catchment area (Table 3-1):

At the protection zone:

- The fence of the protection area.
- The diversion drainage above the catchment.
- Wet spots indicating a leakage from the catchment.
- Trespass such as prohibited farming in the intake area.

At the spring chamber:

- Leakage at the chamber
- The manhole cover
- Blockage at the supply line - water comes through the reserve (overflow) pipe
- The ventilation
- The water quality and quantity
- Sedimentation in the chamber
- If possible measure the yield of the spring and compare it with data of previous years

Table 3.1: Operation and Maintenance Schedule for Springs

Daily	• Inspect and clean the spring site. • Ensure the outlet is clean and functioning. • Check the fence or barrier is in good condition. • Where present, ensure the spring box inspection port lid is in place, locked and in good condition. • Where present, ensure the spring box air vent and overflow pipe is in place and in good condition. Ensure protective vermin-proof screens are in good condition.
Annually	• Perform detailed inspection of the protective wall or spring box and the backfill area for obvious signs of damage or failure. • Where a spring box is present, check the sediment levels.
As the need arises	• Remove sediment, clean and disinfect the spring box (e.g. chlorine disinfection). • Monitor water use and yield (e.g. during periods of drought). • Clear the storm water diversion ditch. • Clear the drainage channel.
Adapted from Management Advice Sheet: Spring source - WHO (Draft: 25 February 2020)	

3.7.2. Boreholes and Wells

The following steps are involved in the construction of boreholes:

i) **Bore siting**

Before borehole drilling there is need to conduct a Hydro-geological Survey in the proposed site. Generally, groundwater is unequally distributed surveys ascertains suitable sites for exploration of significant quantities of groundwater before carrying out any drilling exercise. This ensures the best spot is selected according to the geological data. The hydro-geological data, maps, graphs and cross-section profiles obtained from the hydro-geological survey are used in determination of important information such as estimation of drilling depth and Identification of stress areas. Another aspect of borehole siting that demands careful consideration in populated areas is the potential for contamination by livestock and pit latrines or other waste disposal facilities.

ii) **Actual drilling**

The choice of drilling method will depend on the location of the health facility and geological formations of the area such as the type of terrain, nature of aquifer and financial implications. Table 3-2 gives a comparison of the various methods of drilling.

Table 3.2: Comparison of drilling methods

Drilling methods	Advantages	Disadvantages
Manual construction (Hand dug wells and hand drilling)	Simple technology using cheap labour	Shallow depths only
Percussion drilling	Simple rigs, low-cost operation	Slow, shallow depths only
Rotary drilling, direct circulation	Fast drilling, no depth limit, needs no temporary casing	Expensive operation, may need large working space for rig and mud pits, may require a lot of water, mud cake build-up may hamper development
Rotary DTH, air circulation	Very fast in hard formations, needs no water, no pollution of aquifer	Generally not used in soft, unstable formations, drilling depth below water table limited by hydraulic pressure
Rotary, reverse circulation (not described in text)	Leaves no mud cake, rapid drilling in coarse unconsolidated formations at large diameters	Large, expensive rigs, may require a lot of water

iii) **Borehole development**

Developing a well is the process of removing fine soil particles, drill cuttings, and residual drilling mud from the well screen and borehole annulus in order to establish a good hydraulic connection with the surrounding formation. This development aims at repairing the damage done to the aquifer during the course of drilling by removing additives from the borehole. Development also encourages a gravel filter pack to settle properly, eliminating voids, which may necessitate topping up the gravel pack a little.

iv) **Borehole completion**

Sanitary seal - With borehole cleaning completed, the final job is the construction of a sanitary seal, which, as the name suggests, seals the borehole from surface contamination. This should also be the responsibility of the drilling contractor, and written into the work. At least the uppermost two meters or so of annular space (probably that section formerly protected by the conductor pipe during drilling) should be cleaned out and dug into a fresh larger hole – perhaps square in shape – surrounding the permanent casing. Then the top of the casing must be sealed with a locked cap or welded plate, on which the borehole identification number may be inscribed (Figure 3-1).

Pumps and test pumping - After drilling has been completed and the sanitary seal put in place, borehole test pumping is carried out. It has the following objectives:

- To measure the performance of the borehole
- To determine the efficiency of the borehole, or variation of its performance under different rates of discharge
- To quantify aquifer characteristics, such as transmissivity, hydraulic conductivity, and storativity

Checking verticality - After the testing equipment has been removed, a check of borehole verticality ('plumbness') and alignment ('straightness') should be conducted. This is usually done by inserting and lowering into the hole a perfectly straight, 12-metre-long steel rod or pipe, the external diameter of which should be a maximum of 13 mm (about 0.5 inch) less than the inner diameter of the main or longest section of casing.

Disinfection - Finally, assuming that it has passed the tests above, the borehole should be thoroughly disinfected with a chlorine-rich solution, such as HTH (High-test Hypochlorite), leaving a concentration of residual chlorine of 50 milligrams/litre for at least four hours. The borehole may then be re-sealed with the locked cap or welded plate.

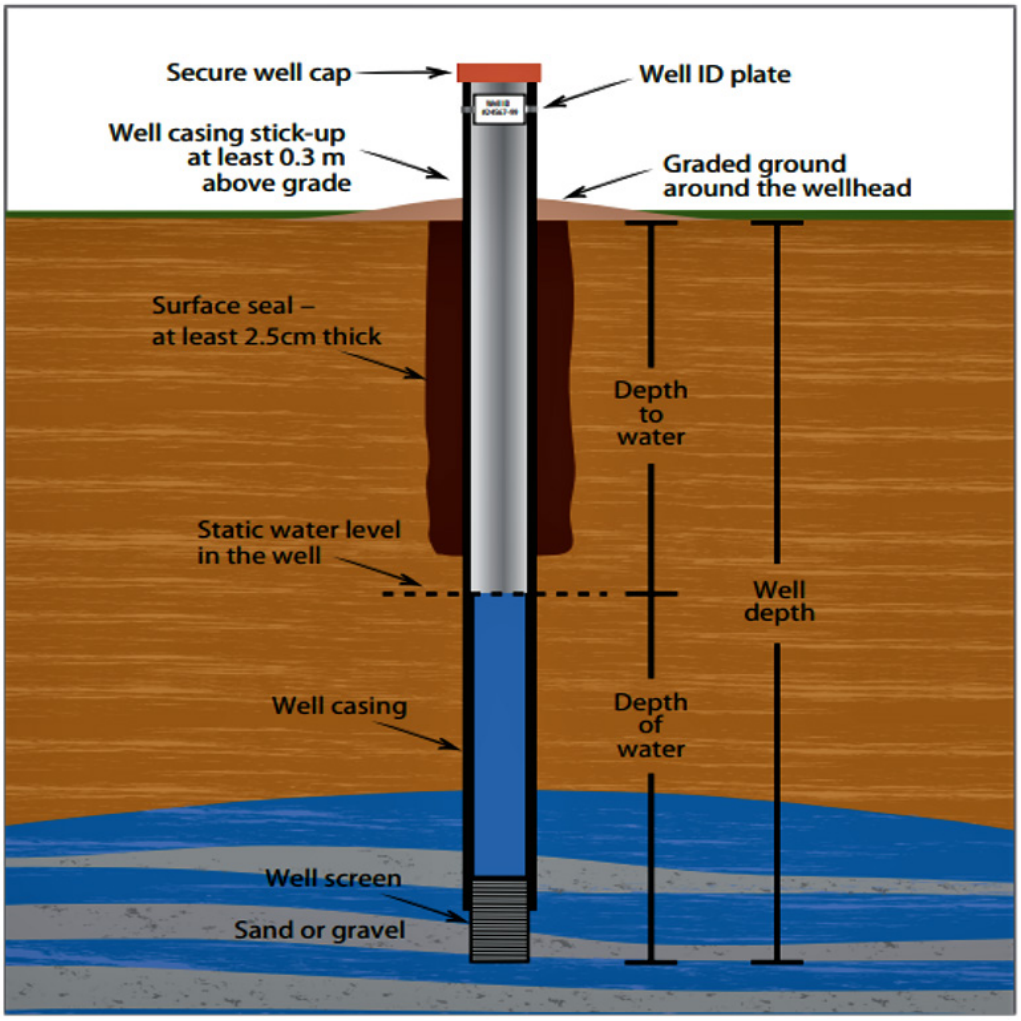

Figure 3.1: Drilled well parts

Source: AAFC (n.y.)

3.7.2.1. Borehole Monitoring

Continuous monitoring of borehole performance can be cost-effective, helping to detect any problems before they become serious. Maintenance programs should consist of regular field visits, water sampling (for chemical/microbial analyses), water level measurements, and routine monitoring by simple step-drawdown tests. The data collected can be compared with those obtained when the well was new or last monitored. A regular testing schedule consisting of a basic step-drawdown test every year is sufficient, with maintenance carried out if there is any sign of deterioration.[6]

It is prudent to erect a lockable fence around the borehole to prevent tampering and accidental or malicious damage. Table 3-3 sets out the symptoms to be noted in a monitoring program, along with causes and suggested remedial actions.

6 Technical guidelines for construction, rehabilitation of drilled water wells – Somalia WASH Cluster -2020

Table 3.3: Borehole monitoring

Monitored symptom	Causes	Remedial action
Regional fall of groundwater level	Regional factors, e.g. drought, large-scale abstraction, extensive deforestation	Lower pump inlet Deepen borehole Drill new (deeper) borehole
Localized fall of groundwater level	Over-pumping Blocked screens or gravel pack	Check/compare earlier test pumping data Reduce pumping rate Rehabilitate: Inspect screens, surge-develop to clean screens and gravel pack
Change in water quality (chemical)	Chemical pollution Saline influx Aquifer mixing	Analyze water; if hazardous, shut down borehole production and reassess situation
Change in water quality (biological)	Pollution Change in water chemistry	Analyze water. If hazardous, shut down borehole production. If temporary, pump out water and disinfect borehole
Unusual corrosion/ incrustation of borehole head works equipment	Water quality, e.g. carbonate (hard water), acidic water, iron bacteria	Remove pump, inspect borehole. Rehabilitate
Reduction of yield (pumping level unchanged)	Pump faulty Piping blocked (incrustation)	Remove and inspect pump Inspect piping; replace if necessary
Unusual noise or vibration (submersible pump)	Damaged/faulty pump	Remove and inspect pump Inspect borehole

Source: Technical guidelines for construction, rehabilitation of drilled water wells – Somalia WASH Cluster -2020

3.7.3. Dug Wells

3.7.3.1. Siting of Dug Wells

Dug wells are generally shallower than boreholes and will therefore generally be sited in areas with high water tables. The location should be carefully selected to ensure good potential for most of the year. The location selected should not be prone to flooding and pollution, especially by storm water from built up areas within the upper reaches of the micro-catchment. Cut off drains should be constructed if this is feared. No pit latrine or septic tank should be constructed upstream of the dug well. To ensure long term good water quality and quantity, it is essential to tackle the pollution problem through sensitization of the community.

3.7.3.2. Diameter and Depth

The diameter of a dug well should be at least 1.2m, to allow two people to work together during the digging exercise. A slight smaller diameter may be used if the digging is to be done by one person only. The well should be at least 3m below the expected lowest water level.

3.7.3.3. Lining

Most dug wells need an inner lining constructed of materials such as brick, stone, in-situ concrete rings or pre-cast concrete rings. Generally, the easiest and safest method of sinking a dug well is to excavate from inside of the precast concrete rings. In very loose soil, other methods such as hand drilling (augering) should be employed. In consolidated ground, including rock formations, the well may stand unlined but the upper section should always have a lining.

The section of the well penetrating the aquifer requires a lining with openings or perforations to allow groundwater to enter. However, in fine sand aquifers, the lining should not have openings or perforations, so that water only enters through the bottom of the well. The bottom of the well should be covered with graded gravel consisting of a 150mm thick layer of grain sizes 1-2mm overlain by a 150mm layer of grain sizes 4-8mm and this should be topped by a 150mm thick layer of grain sizes 20-30mm, to form a proper filter.

3.7.3.4. Protection

The upper part of the lining should be water tight, to a depth of several meters below the lowest draw-down water level in the well. The annular space between the well walls and the lining should be sealed with puddle clay or cement grout, from the ground surface to the top of the aquifer or to at least 2m below the ground surface. The top of the lining should be extended to about 0.5m above the ground surface level, to form a wall around the well.

A concrete apron should be constructed on the ground surface, extending about 2m all around the well and slopping outwards towards a drainage ditch with suitable outfall. The well top should be sealed with a water-tight slab. A manhole that can tightly and securely locked should be provided for the inspection and disinfection of the water in the well. (Figure 3-2)

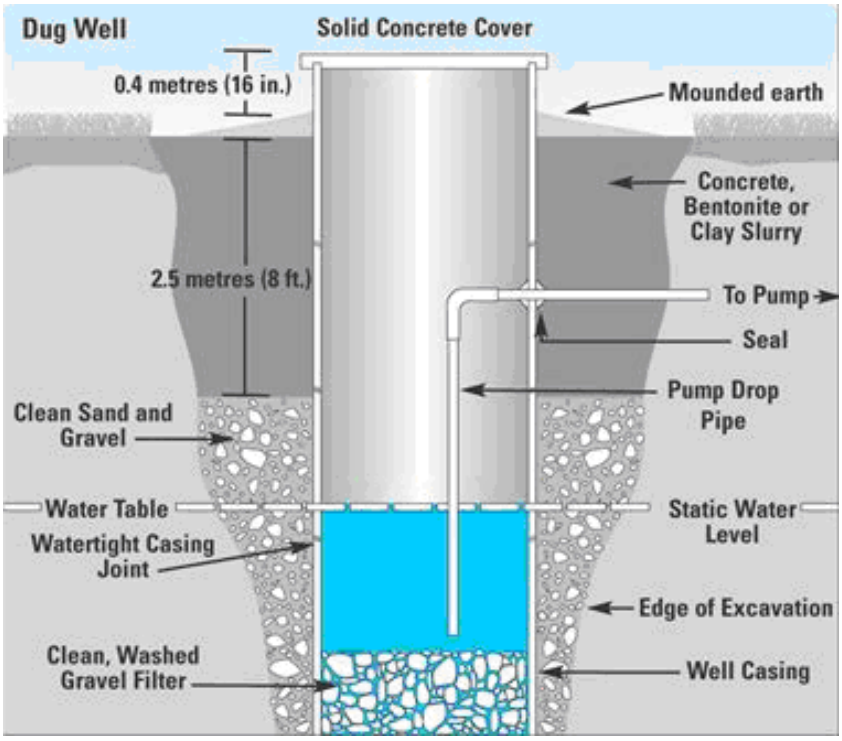

Figure 3.2: Details of a Dug Well

Source: Sustainable Sanitation and Water Management

3.7.4. Rainwater Harvesting

The term "rainwater harvesting" is usually taken to mean "the immediate collection of rainwater running off surfaces upon which it has fallen directly. Where there is no surface water, or where groundwater is deep or inaccessible due to hard ground conditions, or where it is too salty, acidic or otherwise unpleasant or unfit to drink, another source must be sought. In areas which have regular rainfall the most appropriate alternative is the collection of rainwater, called "rainwater harvesting".

3.7.4.1. Roof Catchment

Rainwater can be collected from most forms of roof. Tiled roofs, or roofs sheeted with corrugated mild steel are preferable, since they are the easiest to use and give the cleanest water. Asbestos sheeting or lead-painted surfaces should be avoided due to their adverse health effects.

3.7.4.2. Guttering

The installation of gutters on roofs should take into consideration of the following:

(i) Gutters should be of either square or half circular section made from PVC or galvanized iron sheet metal;

(ii) Gutters should be put in position using gutter brackets, made from PVC or metal stripes fixed to the fascia board of the building;

(iii) The slope of the gutter towards the water tank should be such that there is a drop of about 10cm for every 10m run (i.e. 1% slope). For very long gutters (>15m) fixed on fascia boards, the slope can be varied such that the first half of the gutters is laid at 0.5% slope and the rest at 1% slope to maintain reasonable gap between the gutter and the edge of the roof;

(iv) Starting from the end nearest the tank, gutters should be laid into the brackets so that the next gutter sits inside a previous one with a 20cm overlap. The overlap shall be made stable by applying a bituminous paint between the two overlapping gutters. The brackets should be positioned such that it falls in the center of the overlap; and

(v) The end of the gutters toward the tank should be provided with a down pipe and a purpose made first –flush system;

(vi) The ends of the gutter should be blocked with stoppers to reduce water loss.

3.7.4.3. Provision of first flush system

Many contaminants find their way into the tank from the roof. Waste from birds, rats, cats, lizards, leaves and other debris wash into the tank. This introduces harmful bacteria in to storage water system, which can cause serious illness.

In order to avoid this, routinely sweeping of the roof and removal of debris from gutters is reacquired. The first flush system removes the first 50 to 100liters of rainwater and directs it away from the storage tank. As a rough guide, the minimum storage capacity of a first flush device should be equivalent to 1mm of rainfall over the catchment area developed. i.e 1 litre of storage per square meter of catchment.

3.7.4.4. Selection of Storage Options

The selection of a particular tank depends on the following parameters:

i. Cost (affordability) of the tank
ii. Tank capacity
iii. Location in relation to the plot of land
iv. Availability of materials for construction of the tank
v. Availability of technology and skilled manpower
vi. Appearance (design of the tank)
vii. Catchment area
viii. Type of soils bearing capacity
ix. The tank should be sited should be at least 1.5m from the existing building. This enables plenty of working space during construction and the stability of the not to be tampered with.

3.7.4.5. Sizing the Tank

Tank sizing is important in determining the optimum capacity of a tank for a particular water demand catchment area and amount of rainfall available.

When a tank is sized correctly, it avoids wastage of materials in building a tank that is too large and will never fill, or building a tank that is too small and always overflows. A right size capacity of tank should provide enough water throughout the dry season (months).[7]

- Rainfall data (mm)
- Catchment area (m2)
- Daily water demand
- Length of dry spell

3.7.4.6. Amount of Water for Harvesting

The amount of rainwater that can be harvested from the roof catchment for different rainfall amount and roof size is calculated as follows:

S = K x I x A

Where:

S = Yield in m3

A = Area of catchments, m2

I = Average annual rainfall mm/annum

K = Runoff coefficient (0.8 to 0.9 for roof tiles and 0.7 to 0.9 for corrugated sheets)

3.7.4.7. Water Quality Management

The requirements for management of rainwater quality are as follows:

- Fitting the tank with first flush system to improve the bacteriological and physical quality;
- Cover the tank and provide filtration screens to prevent debris, leaves, insects, and rodents from getting into the tank;
- Regular cleaning of catchment surface and gutter;
- Tree branches hanging over the roof should be trimmed to reduce dry leaves, bird's droppings falling onto the roof;
- Correct installation of gutters to avoid water pooling and collection of debris;
- Prevent or minimize light penetration into the tank to avoid growth of algae and other biological activity;
- Testing/monitoring water quality informs users of risks of contamination;

7 Handbook on rainwater harvesting storage options - MWE

- Cleaning the tank from inside at least twice a year or every start of the rainy season;
- Water disinfection with chlorine to make water safe for drinking

Please Note:

Where first flush devices are not installed or operated properly, the storage tanks should be cleaned regularly e.g. once every 3 months or at least at the beginning of every rainy season. Gutters and covers should be cleaned periodically after leaf fall and soak pit dredged at least once a year.

3.8. Minimum Water Requirements for HCFs

Water demand in health institutions should be based on the situation prevailing at the time of scheme design, the development plans of the Ministry of Health and the District Local Governments, and the projected growth of the local population.

In Uganda, the number of hospital beds can be assumed to be 1.2 per 1,000 people. However, district and other major hospitals should be studied in more detail separately. The water demand for staff should be included in the total demand for the health institution concerned.[8]

Projection of the hospital population should be done on a case-by-case basis using realistic growth estimates and the development plans of the Ministry of Health and other sector players. It should not be assumed to grow at the same rate as the surrounding population since hospital facilities can grow rapidly during the expansion phase but might stagnate for long periods of time. Table 3-4 presents the national minimum water requirements for healthcare facilities in both urban and rural areas.

Table 3.4: Water Demand for HCFs

Consumer	Unit	Rural l/d	Urban l/d	Remark
Health care Dispensaries	l/visitor/d	10	50	Out patients only
Health Center II	l/bed/d	50	70	With maternity With pit latrine
Health Center III	l/bed/d	70	100	With maternity With pit latrine
Health Center IV	l/bed/d	100	150	With maternity With WC

8 MWE Water Supply and Design Manual, Second Edition 2013

Consumer	Unit	Rural l/d	Urban l/d	Remark
Hospital, District	l/bed/d	-	200	With surgery unit
Hospital, Regional Referral	l/bed/d	-	400	With surgery unit
Administrative Offices	l/worker/d	10	70	With pit latrine With W

Source: MWE - Water Supply Design Manual Second Edition, 2013

The following minimum requirements (Table 3-5) for the water supply are intended for ensuring adequate and reliable supply of water for the HCFs.

Table 3.5: Minimum requirements for water supply in HCFs

HCF Level	Recommended Source of Water Supply	Water supply system components	Water consumption rate	Sizing of system components
HCII	• Rainwater harvesting tank • Hand pump borehole. • 24hr Piped water supply	• Water reticulation Pipework • Central water storage tank	• The daily water consumption rates for the health care workers, staff and patients including out patients and admitted patients at the health care facility are as provided in the latest version of the Water Supply Manual of the Ministry of Water and Environment. • Consideration for admitted patients includes the recommended number of beds of the health care facility and not more than two care givers per bed. • The source of water supply should meet the aggregate daily water consumption rates of the health care facility.	• Rainwater harvesting tanks to be sized as recommended in section 6.7.4.5. • The central water storage tank for piped water supply system is to be of 2 days water demand capacity of the respective HCF. • Water reticulation pipework to be sized based on the peak hour demand for various demand areas at the HCF.
HCIII	• 24hr Piped water supply • Rainwater harvesting tank • Hand pump borehole.	• Water reticulation Pipework • Central water storage tank		
HCIV	• 24hr Piped water supply • Powered borehole • Rainwater harvesting to be considered as optional supplementary	• Central water storage tank • Water reticulation pipework		
Referral Hospital National Referral Hospital	• 24hr Piped water supply • Rainwater harvesting to be considered as optional supplementary	• Dedicated central water storage tank • Water reticulation pipework to supply various demand areas		

Specific average water demand per facility will be determined based on average data available for OPD, IPD, staffing and various health services/procedures undertaken by the facility (See Table 3-6 water supply for minimum per capita consumption in HCFs).

Table 3.6: Water Supply for Minimum Per-capita Consumption in HCFs

Activity	Minimum Water Quantity Requirement
Staff	5 litres/person/day
Outpatients	5 litres/consultation/day
Inpatients	40-60 liters/patient/day
Operating Theatre /Maternity Unit	100 liters/intervention
Dry or supplementary Feeding Center	0.5-5 liters/consultation (Depending on waiting time)
Wet or supplementary Feeding Center	15 liters/consultation
Inpatient Therapeutic Feeding Center	30 liters/patient/day
	15 liters/patient/day
Cholera Treatment Center	60 liters/patient/day
	15 liters/caregiver/day
Acute Respiratory Diseases Isolation Ward	100 liters/patient/day
	15 liters/caregiver/day
Viral Haemorrhagic Fever Isolation Ward	300-400 liters/patient/day
	15 liters/caregiver/day

Source: WASH in Healthcare Facilities in Emergencies, WHO 2012

3.9. Water Storage

The purpose of storing water in the HCFs is mainly to balance out the variations in water demand during the day and also to allow for emergency storage to ensure supply during break-downs. The aggregate water volume required for both balancing and emergency purposes can be kept in one or more storage reservoirs.

The balancing storage is normally of the order of 30% of the maximum day demand for a 24-hour constant supply rate.

Emergency storage is also considered in order to have water during daily peak demand even in case of a major break upstream of the reservoir. It is usual to foresee an emergency storage

volume corresponding to 2 hours of average consumption or more in areas where there is no technical staff available to carryout major repairs immediately.

Please Note:

It recommended that facilities have a central water storage tank with a 2 days water demand capacity.

3.9.1. Storage Reservoir Design

The selection of the storage reservoir materials largely depends on whether the reservoir is to be placed on the ground or to be elevated on a support structure. Ground storage reservoirs are normally reinforced concrete or concrete blocks or bricks. Elevated reservoirs are normally made out of galvanised pressed steel panels, and placed on steel support structures. All other factors being equal, the most economical storage reservoir shape is "circular", followed by "square" and lastly "rectangular". Normally the depth of water should not exceed 5m.

Reservoir sites should be selected such that they are on stable ground, not threatened by landslide or erosion. Level ground sites are preferable because they simplify excavation work. The design of storage reservoir foundations must be based on proper evaluations of ground bearing capacities.

3.9.2. Capacities

It is recommended that reservoirs are provided in standard capacities of 10, 25, 50, 100, 150, 200, 300, 500, 800 and 1,200 m^3.

3.9.3. Design Features

The size of the inlet line is determined by the water supply demand requirements of the facility and should have a shut off valve next to the reservoir. The size of the outlet is also determined by the demand requirements and should be located at least 200 mm above the reservoir bottom. This creates a dead volume which allows for settlement of sediment. It should also have a shut-off valve adjacent to the reservoir. The drain (washout) facilities for cleaning of the reservoir and is located at the bottom of the tank. Cleaning is done by shutting the main line valve and opening the discharge line. The reservoir is constructed with a slope towards the drain line to simplify cleaning. Reservoirs should have an overflow line that can support the maximum anticipated overflow. The overflow pipes should be at least 50% larger than the inlet pipes and should be well screened and covered. It should be possible to observe the overflow so that the inlets can be controlled.

Manholes and covers are installed to provide an entrance during cleaning, maintenance and repair. They should be raised higher than the roof level to prevent entry of contaminated surface water. The manhole covers prevent entry of sun rays that encourage algae growth. They should be lockable.

Water level indicators are used to indicate the water level inside the reservoirs. A depth gauge using a float and wire is usually used. The type of control valves used will depend on the type of operation used by the system. The flow into the reservoir may be stopped manually or automatically by a float valve, pressure switch or any other device. Double orifice valves allow release of air when water is flowing while single orifice valves will allow release of air accumulated at specific points to be released when water starts flowing. Large reservoirs should be equipped with internal and external ladders and have external walkways and handrails, especially if they are elevated. They should be approximately partitioned if the reservoirs exceed 500 m^3.

3.9.4. Structural Design of Reservoirs

The structural design of reservoirs will require expertise in the following categories:

i) Reinforced concrete storage reservoir design
ii) Stonemasonry storage reservoir design
iii) Steel plate storage reservoir design; and
iv) Plastic storage reservoir design.

Care must be exercised to ensure that the above aspects are done in accordance with the relevant guidelines and details are produced accordingly.

3.10. Water quality

Water for drinking, cooking, personal hygiene, medical activities, cleaning and laundry is safe for the purpose intended. The water should be free from chemical, physical and bacteriological substances.

3.10.1. Water quality requirement

The quality of water for use at the health care facility should meet the most recent edition of the Uganda National Bureau of Standards (UNBS) and WHO (2006) drinking water quality guidelines in Table 3-7.

Table 3.7: Water Quality Standards

Characteristic	Unit	Guidelines	
		Uganda	WHO
Physical Parameters			
Colour	TCU	10	15
Odour		Odourless	
Taste		Not objectionable	
Turbidity	NTU	5	5
Total Dissolved Solids	mg/l	700	1000†
Total Suspended Solids (at 105°C)	mg/l	Not detectable	Nil
Electrical Conductivity (EC)	µS/cm	1500	
Chemical Parameters			
pH		6.5 - 8.5	
Total Hardness (as $CaCO_3$)	mg/l	300	
Total Alkalinity			
Calcium (as Ca)	mg/l	150	
Sodium (as Na)	mg/l	200	50
Potassium (as K)	mg/l	100	
Magnesium (as Mg)	mg/l	100	
Arsenic (as As)	mg/l	0.01	0.01
Copper (as Cu)	mg/l	1.0	2
Chloride (as Cl)	mg/l	250	250†
Total Chromium (as Cr)	mg/l	0.05	0.05
Fluoride (as Fl)	mg/l	1.0	1.5
Boron (as Boric acid)	mg/l	2.4	2.4
Molybdenum	mg/l	0.07	
Total Iron (as Fe)	mg/l	0.3	0.3

Characteristic	Unit	Guidelines	
		Uganda	WHO
Manganese (as Mn)	mg/l	0.1	0.4
Phosphates (as PO_4^{3-})	mg/l	2.2	
Ammonia (as NH_3)	mg/l	0.5	
Nitrates (as NO_3)	mg/l	45	50
Nitrites (as NO_2)	mg/l	0.003	3
Barium	mg/l	0.7	1.3
Aluminium (as Al)	mg/l	0.2	0.2
Sulphates	mg/l	400	250†
Copper	mg/l	1.0	2.0
Zinc (as Zn)	mg/l	5.0	
Lead (as Pb)	mg/l	0.01	0.01
Nickel (as Ni)	mg/l	0.02	0.07
Selenium (as Se)	mg/l	0.01	0.04
Cadmium (as Cd)	mg/l	0.003	0.003
Mercury (as Hg)	mg/l	0.001	0.006
Cyanide	mg/l	0.01	
Poly nuclear aromatic substances	mg/l	Nil	
Residual free chlorine	mg/l	0.2-0.5	0.2-0.5
Aldrin/Dieldrin	mg/l	0.03	0.00003
Chlordane (Total)	mg/l	0.3	0.0002
DDT (Total)	mg/l	1	0.001
Lindane BHC	mg/l	2	0.002
Methoxychlor	mg/l	20	0.02
Chloroform	mg/l	30	0.3
Bacteriological Requirements			

Characteristic	Unit	Guidelines	
		Uganda	WHO
Total Coliforms	Cfu/100ml	0	0
Faecal (Thermotolerant) Coliforms	Cfu/100ml		0
E. Coli	Cfu/100ml	0	0
Salmonella spp	in 100ml	0	0

Source: Uganda National Bureau of Standards – Uganda Standard Potable Water Specification (US EAS 12:2014; ICS 13.060.20) and World Health Organisation Drinking water Standards (2017); Empty cells – guideline values not specified.

3.10.2. Disinfection

Disinfection with chlorine is the most widely accepted and appropriate way of providing microbial safety in most low-cost settings. Bleaching powder, liquid bleach, chlorine tablets and other sources of chlorine may be used, depending on local availability. To ensure adequate disinfection, a contact time of at least 30 minutes should be allowed between the moment the chlorine is added to the water and the moment the water is available for consumption or use. The free chlorine residual (the free form of chlorine remaining in the water) after the contact time should be between 0.5 and 1.0 milligrams per litre (WHO, 2006) in all points of the system, including end-points. Residual chlorine can be measured with simple equipment (e.g. a colour comparator and diethyl-phenylenediamine tablets). Mains supply water may need supplementary chlorination to ensure adequate disinfection and a sufficient level of residual chlorine up to the point of consumption or use. Many mains water supplies do not achieve adequate water safety at the point of delivery, due to problems at the water treatment works and contamination in the distribution system. Stored water may also need supplementary chlorination before use. Water must not be contaminated in the health-care setting during storage, distribution and handling.

Effective disinfection requires that the water has a low turbidity. Ideally, median turbidity should be below 1 nephelometric turbidity unit (NTU) (WHO, 1997). However, 5 NTU is the minimum turbidity measurable with simple equipment (turbidity tube), so this level may be used in low-cost settings in practice. If turbidity exceeds 5 NTU then the water should be treated to remove suspended matter before disinfection, by sedimentation (with or without coagulation and flocculation) and/or filtration.

Filtration with ceramic (e.g. candle filters), chlorination and other technologies that can be used on a small scale may be appropriate for treating water in health-care facilities that are not connected to piped supplies, as well as those that are connected to piped supplies whose quality is not consistently satisfactory (WHO, 2002a).

3.10.3. Water Quality Monitoring

Drinking water quality at a HCF should be routinely monitored for E. coli, total coliforms, residual chlorine, arsenic and fluorides. Quality of water for cooking, personal hygiene, medical activities, cleaning and laundry should be monitored for E. coli, total coliforms, residual chlorine and arsenic).[9]

Monitoring reports should be prepared and duly kept on file for seasonal variation review and future references in cases where there is need to correct the water quality design to the HCF.

In case the water quality fails to meet the recommended standards, HCF to seek expert opinion through the respective jurisdiction for necessary interventions for the water quality improvement.

Where interventions for improvement of the quality of the water is not possible, the source of water should be decommissioned and search for alternative sources.

Tables 3-8 and 3-9 show the minimum frequency of sampling and the acceptable physico-chemical and microbiological monitoring of operational efficiency in a water treatment plant, respectively.

Table 3.8: Minimum Frequency of Sampling of Water for Surveillance

Population Served (P)	Frequency (*minimum) of Sampling
P > 100,000	10 samples every month per 100,000 of population
25,001 – 100,000	10 samples every month
10,001 – 25,000	3 samples every month
2,500 – 10,000	2 samples every month
P < 2,500	1 Sample every month
*During the rainy season, sampling should be carried out more frequently	
Source: Uganda National Bureau of Standards – Uganda Standard Potable Water Specification (US EAS 12:2014; ICS 13.060.20)	

Table 3.9: Physico-chemical and microbiological parameters required for minimum monitoring

Property	Testing method
Physico-chemical:	
Conductivity or dissolved solids	ISO 7888
Colour	ISO 7887

9 JMP World Health Organization and the United Nations Children's Fund (UNICEF) 2018

Property	Testing method
Turbidity	ISO 7027
Taste	-
Odour	-
Microbiological:	
Faecal coliform bacteria or E-Coli	ISO 4832
Salmonella spp	-
Shiegella spp	-
Chemical:	
Flouride as F^-	ISO 10359
Nitrate	ISO 7890
Nitrite	ISO 6777
Aluminium	ISO 12020
Iron (total)	ISO 6362
Ammonia	ISO 9174
Residual chlorine	ISO 7393
Source: Uganda National Bureau of Standards – Uganda Standard Potable Water Specification (US EAS 12:2014; ICS 13.060.20)	

If abnormal results are encountered in any of these analyses, sampling frequency shall be increased and/or additional analyses carried out.

The responsibility for monitoring the quality of water used at the HCF is under the HCF in-charge.

3.11. Water Facilities and Access to Water

Sufficient water collection points and water-use facilities should be available in the healthcare facility to allow for convenient access to, and use of, water for medical activities, drinking, personal hygiene, food preparation, laundry and cleaning.[10] As a guiding principle water should be available within the all the wards and in waiting areas.

10 Essential Environmental Health Standards in Healthcare – WHO 2008

3.11.1. Drinking-water Points

Drinking-water should be provided separately from water provided for handwashing and other purposes, even if it is from the same supply. Drinking-water may be provided from a piped water system or via a covered container with a tap where there is no piped supply. Drinking-water points should be clearly marked.

3.11.2. Handwashing Facilities

Basic hygiene measures by staff, patients and carers, handwashing in particular, should not be compromised by lack of water. A reliable water point with soap or a suitable alternative is available at all critical points within the health-care facility (operating theatres, wards, consulting rooms, dressing stations, etc.) and in service areas (sterilization, laboratory, kitchen, laundry, showers, toilets, waste zone and mortuary).

Water points should be sufficiently close to users to encourage them to use water as often as required. Alternatively, a handwashing basin, soap and a jug of clean water may be placed on a trolley used for ward rounds, to encourage handwashing as often as needed between patient contacts.

At least two handwashing basins should be provided in wards with more than 20 beds.

3.11.3. Showering Facilities

Although less important than handwashing in terms of reducing disease transmission, showering (or other means of washing the body) may be important for the recovery of certain patients, and may be required by staff and carers in contact with infectious patients. If piped hot water is available, measures should be taken to avoid the proliferation of bacteria in the water system. For this reason, piped water and water from showers should ideally be maintained below 20°C or above 50°C.

Separate showers may be needed for staff and patients, and for both sexes, to ensure that all groups have adequate privacy and safety.

At least one shower is available for 40 users in patient settings (users include patients, staff and staff and carers staying in the healthcare facility).

3.11.4. Laundry facilities

Laundry facilities, with soap or detergent, hot water and a disinfectant (such as chlorine solution), should be available for inpatient settings.

3.12. Operation and Maintenance of the Water Supply System

Operation of the water supply system components should be carried out in accordance with the supplier's recommendations.

The maintenance requirements for the water supply components are summarized in the Table 3-10.

Table 3.10: Maintenance of the Water Supply System

Type of supply system components	O&M requirements
Rain water harvesting system	• Regular cleaning of the roof catchment surfaces and gutters • Trimming of tree branches hanging over the roof catchment to reduce dry leaves and bird's droppings falling onto the roof; • Drain and clean the tank with clean brooms/brushes • Disinfection of the of the tank with chlorine • Cleaning should be done quarterly
Hand pump borehole	• All faults on hand pump boreholes to be repaired by a qualified hand pump mechanic or area service provide whom the HCF can sign a contract with if need be.
Powered borehole	• Maintenance requirements to be in accordance with suppliers' recommendations
Piped water service connection including the water meter	• Maintenance requirements for service connections are of the utility owner's responsibility
Quality of piped water service	• Report to the utility owner
Supply pipeline between the water meter and the storage tank	• Maintenance requirements for the service line are the responsibility of the healthcare facility to be handled by a qualified technician.
Piped water storage tank	• Routine inspection for leakages • Drain and clean the tank with clean brooms/brushes • Disinfection of the tank with chlorine with guidance of a qualified person • Cleaning and disinfection of the tank to be done on quarterly intervals
Distribution pipe network	• Carry out necessary repairs in case of leakages
Pipework Fittings including valves, taps, etc.	• Should be inspected for any malfunction • Necessary repairs should be carried out by qualified technicians

CHAPTER 4: **SANITATION FACILITIES**

4.1. Introduction

These guidelines spell out the provision of adequate and appropriate sanitation facilities for management and safe disposal of human waste, domestic solid waste, medical / healthcare waste and waste water. This entails the construction and/or rehabilitation and management of sanitation facilities, their hygienic maintenance, garbage including health care waste (including placenta) management and waste water disposal.

Improved sanitation in health facilities is critical in the preventing the spread of infectious microorganisms found in human faecal material, medical and waste from getting in to contact with people and posing a threat to their health. Appropriately designed and adequate sanitation facilities/services are critical in the prevention and or minimizes the spread of diseases within the HCFs. These guidelines provide for planning for sanitation in HCFs, sanitation options for different levels of health facilities, standards of technical designs and specifications for sanitation facilities including those of people with special needs.

4.2. Objective

- To provide adequate and appropriate sanitation facilities for management and safe disposal of human waste, domestic solid waste, medical / healthcare waste and waste water.

4.3. General Adequacy Criteria for Excreta Disposal Facilities in HCFs

Generally, sanitation services in HCFs will be satisfactory and adequate if the following minimum requirements are met.

4.3.1. Toilet user Ratio

WHO recommends a ratio of one toilet per 20 users and should be used as a planning guideline for inpatient settings. Users include patients, staff and carers.

In outpatient settings, a suitable arrangement is often as follows: one toilet for staff (two if separate toilets are required for male and female staff), one toilet for male patients, one toilet for female patients, and one child's toilet.

At least one shower is available for 40 users in inpatient settings (users include patients, staff and carers staying in the health-care setting).

4.3.2. User convenience

Provide well labelled separate toilet stances for female and male users for health care workers, visitors, patients and people with special needs such as children, people with disability, expectant women and the elderly. The toilets of those with special needs should be designed appropriately to meet their needs such as ramps for wheel chair, support rails and color lines for the visually impaired. In addition, efforts should be made to ensure that the toilets are designed and equipped to respond to social and cultural norms such as provision of water for anal cleansing, lockable doors for privacy and a clear access pathway adequately lit at night. Floors in washroom facilities to be provided with drainage facilities for spilled water to keep the floors in dry conditions as much as possible.

4.3.3. Accessibility

Toilets should be conveniently located; preferably not more than 30 meters from all users' locations for ease of reach. In addition, they should have clear path ways that are devoid of any form of obstruction (physical or non-physical) that is toilets must be open for use when needed.

Under no circumstances should the toilet doors be locked preventing access to users except in situations of safety and a key is available at all times.

4.3.4. Reliability

Toilets should at all times be functional i.e. good state of repair and in hygienic condition. Toilets or any other sanitation facility should be utilized for the purpose for which it was intended.

4.3.5. Functionality of the Sanitation Facility

A toilet is considered functional if it is not broken, the toilet hole is not blocked, there should be no cracks or leaks in the toilet structure and water should be available for flush/pour-flush toilets.

The sanitation facility should be utilized and maintained for the purpose for which it is intended and should not be converted in to any other uses such as storage spaces.

4.3.6. Safety

The sanitation waste disposal facilities should be designed and constructed to ensure that waste or human excreta do not get into contact with people or transmit infectious microorganisms, physical contaminants, or harbor vector or vermin. In addition, adequate measures should be put in place to control flies and mosquito breeding in and around toilets. The sanitary facilities should be structurally sound without presenting the risk of collapsing, falling posing a risk of injury to users.

To minimize the risk of violence, including sexual violence and or harm toilets should be properly located, with lockable doors (from inside) and access should be adequately lit at night.

4.3.7. Convenient Hand Washing Facility Close-by

A toilet is not complete without a hand washing point with soap, water and adequate drainage. All toilet designs should include convenient hand washing facilities so that hand washing after using the toilet can become a routine activity for the patients, visitors, caretakers and healthcare workers. Hand washing facilities can be located outside toilet stance but within toilet block in order to wash hand after exiting toilet stance. Hand hygiene facilities at toilets must be located no more than 5 meters from the toilets. Taps that limit risk of cross-contamination through touch e.g. elbow/arm operated taps, foot pumps or time delay self-closing taps should be prioritized. Wastewater from hand washing should be drained to a sewer or soakaway pits built using rocks/ coarse gravel. More information on hand hygiene is included in Section 5-4.

4.3.8. Easy to Clean Surfaces

Toilets should be designed and built so that they are hygienic to use and do not become centres for disease transmission. Surfaces that may be soiled should be of smooth, waterproof and hardwearing material that can be cleaned with water and is resistant to cleaning products.

In terms of cleaning, the slab is the most important part of a toilet; it should be made of concrete or some other hardwearing and smooth material. Other parts of the toilet, such as the superstructure, can be made with cheaper local materials. The design of the toilet should include measures to minimize odours, and control the breeding of flies and mosquitoes.

The floors in washrooms should be provided with anti-slippery finishing / tiles and the walls to be tiled for ease of cleaning.

4.3.9. Menstrual Hygiene Wastes Handling Facilities

The washroom and/or toilet stances on ladies' side of sanitation facilities should contain water and appropriate containers (for primary collection of the used menstrual materials in order to prevent blockages of sewerage pipes or difficulties in desludging pits or septic tanks. There should be a system for collection and disposal of menstrual wastes after removal from the toilets/ washrooms. The waste handling, transportation and disposal practices detailed in Chapter 11 can be applied to menstrual hygiene wastes.

4.3.10. WASH Facilities should Ensure Infection Prevention and Control

Water, Sanitation and Hygiene (WASH) facilities should prevent infection and its spread in health care facilities to prevent people catching an infection while receiving health care. Therefore, HCFs should develop a simple system to monitor functionality of WASH services. The following aspects must be frequently monitored: availability of water, availability of chlorine, detergents and disinfectants, handwashing systems (water/soap, alcohol rub /hand sanitizers or chlorine

water), bathroom and toilets cleanliness, medical and solid waste regular disposal and safe elimination (UNICEF, 2020).[11]

4.3.11. A Cleaning and Maintenance Routine

Toilets in patient care areas can be private (within a private patient room) or shared (among patients and visitors). They have high patient exposure (i.e. high-touch surfaces) and are frequently contaminated. Therefore, they pose a higher risk of pathogen transmission than in general patient areas.

Toileting practices vary, in terms of both the types of toilets in use (e.g., squat or sit, wet or dry) and the adherence to correct use. Therefore, needs for cleaning and disinfection vary. In some cases, more than twice daily cleaning and disinfection may be warranted.

Recommended frequencies, method and process for cleaning patient area toilets is presented in Table 4-1.

Table 4.1: Recommended Frequency, Method and Process for Patient Area Toilets

Area	Frequency	Method	Process
Private toilets	At least once daily (e.g., per 24-hour period), after routine cleaning of patient care area	Clean and disinfect	High-touch and frequently contaminated surfaces in toilet areas (e.g., handwashing sinks, faucets (taps), handles, toilet seat, door handles) and floors
Public or shared toilets (e.g., patients, visitors, family members)	At least twice daily	Clean and disinfect	High-touch and frequently contaminated surfaces in toilet areas (e.g., handwashing sinks, faucets, handles, toilet seat, door handles) and floors
Both (private and shared)	Scheduled basis (e.g., weekly) and when visibly soiled	Clean	Low-touch surfaces

4.4. Recommended sanitation technologies for health care facilities

The sanitation technologies options for human excreta disposal includes several options from simple and economical technologies such as improved latrines to more complicated water-

11 UNICEF (2020) COVID-19 Emergency Preparedness and Response: WASH and Infection Prevention and control in Health Care Facilities. https://www.unicef.org/media/66386/file/WASH-COVID-19-infection-prevention-and-control-in-health-care-facilities-2020.pdf

based sewage systems. These guidelines recommend any of the two systems based on the capacity of the health facility to manage the selected system.

1. Drainable Lined Ventilated Improved pit (VIP) latrines (Figure 4-1)
2. Water borne toilets connected to septic tanks and soak pits
3. Waterborne toilets connected to sewers

Waterborne toilets can be of seat type - Figure 4-2 or squatting flush toilet – Figure 4-3. The seat type to be used in stances for vulnerable persons while squat flush toilets for the public. Grey water can also be connected to sewers or septic tank.

Figure 4.1: Drainable VIP Latrine

Source: Kagga & Partners

Figure 4.2: Flush toilet

Figure 4.3: Squat Flush Toilet

Source: Kagga & Partners

Figure 4.4: Trough Urinal

Figure 4.5: Wall mounted Ceramic Bowl Urinals

Source: Kagga & Partners

Table 4-2 presents the minimum requirements for sanitation facilities in HCFs.

Table 4.2: Desirable requirements for sanitation facilities in HCFs

Health care category	Sanitation Facilities				
	Users category	Facility	Type	Requirement	
				Male	Female
HCII	Patients	Toilets	Lined VIP latrine	1:20 stance - user ratio	1:20 stance - user ratio
		Urinal	Trough	1 urinal slab	N/A
		Bathrooms	Masonry wall cubical	N/A	1:40 cubical – user ratio
	HCWs and staff	Toilets	Lined VIP latrine	1 Stance	1 Stance
		Bathrooms	Masonry wall cubical	1 Stance	1 Stance
	Children	Toilets	Lined VIP latrine	1 Stance	
	General facilities	In all female toilets there should be a receptacle bin lidded and foot operated lined with a plastic bag for disposal of sanitary pads.			
HCIII	Patients	Toilets	Water borne toilets / Lined VIP latrine	1:20 stance - user ratio	1:20 stance - user ratio
		Urinal	Trough	1 urinal slab	
		Bathrooms	Masonry wall cubical	N/A	1 No. cubical per 40 users

Health care category	Sanitation Facilities				
	Users category	Facility	Type	Requirement	
				Male	Female
	HCWs and staff	Toilets	Water borne toilets / Lined VIP latrine	1 Stance	1 Stance
		Bathrooms	Masonry wall cubical	1 No. cubical	1 No. cubical
	Children	Toilet	Water borne toilets / Lined VIP latrine	1 Stance	
	PWDs	Toilet	Water borne toilets / Lined VIP latrine	1 Stance	
	General facilities	In all female toilets there should be a receptacle bin lidded and foot operated lined with a plastic bag for disposal of sanitary pads.			
		Placenta pit and			
		Incinerator			
HCIV	Patients	Toilets	Water borne toilets / Lined VIP latrine	1:20 WC - users ratio for wards	1:20 WC - users ratio for wards
		Urinal	Ceramic Bowl/Trough	2 user urinal in each department	N/A
		Bathrooms	Plumbed bathrooms	1:40 shower - users ratio for wards	1:40 shower - users ratio for ward
	HCWs and staff	Toilets	Water borne toilets / Lined VIP latrine	1 stance in each department	1 stance in each department
		Urinal	Ceramic Bowl urinals	2 user urinal	N/A
		Bathrooms	Plumbed bathrooms	1 bathroom in each department	1 bathroom in each department
	PWDs	Toilets	Water borne toilets	1 No. WC	1 No. WC

Health care category	Sanitation Facilities				
	Users category	Facility	Type	Requirement	
				Male	Female
	Children	Toilets	Water borne toilets/VIP	1 stance in each department	1 stance in each department
	General facilities	Placenta pit			
		Incinerator			
		In all female toilets there should be a receptacle bin lidded and foot operated lined with a plastic bag for disposal of sanitary pads.			
Referral Hospital	Patients	Toilets	Water borne toilets	1:20 WC - users ratio for wards	1:20 WC - users ratio for wards
		Urinal	Ceramic bowl urinal / Trough	3 user urinal	N/A
		Bathrooms	Plumbed bathrooms	1:40 shower - users ratio for wards	1:40 shower - users ratio for ward
	HCWs and staff	Toilets	Water borne toilets	1 WC in each department	1 WC in each department
		Urinal	Ceramic bowl urinal	2 User urinal	N/A
		Bathrooms	Shower bathrooms	1 shower in each ward	1 shower in each ward
	PWDs	Toilets	Water borne toilets	1 WC in each department	1 WC in each department
	Children	Toilets	Water borne toilets	1 WC in each department	1 WC in each department
		Urinal	Ceramic bowl urinal	2 User urinal	N/A
	General facilities	Placenta pit			
		Incinerator			
		In all female toilets there should be a receptacle bin lidded and foot operated lined with a plastic bag for disposal of sanitary pads.			

Health care category	Sanitation Facilities				
	Users category	Facility	Type	Requirement	
				Male	Female
National Referral Hospital	Patients	Toilets	Water borne toilets	1:20 WC - users ratio for wards	1:20 WC - users ratio for wards
		Urinal	Ceramic bowl urinal / Trough	3 user urinal	N/A
		Bathrooms	Plumbed bathrooms	1:40 shower - users ratio for wards	1:40 shower - users ratio for ward
	HCWs and staff	Toilets	Water borne toilets	1 WC in each department	1 WC in each department
		Urinal	Ceramic bowl urinals	2 user urinal	N/A
		Bathrooms	Plumbed bathrooms	1 bathroom in each department	1 bathroom in each department
	PWDs	Toilets	Water borne toilets	1 WC in each department	1 WC in each department
	Children	Toilets	Water borne toilets	1 WC in each department	1 WC in each department
		Urinal	Ceramic bowl urinals	2 user urinal	N/A
	General facilities	Placenta pit			
		Incinerator			
		In all female toilets there should be a receptacle bin lidded and foot operated lined with a plastic bag for disposal of sanitary pads.			
Standby VIP latrines are recommended for all the HCFs in case of water outages for the piped water supply systems.					

4.5. Design and construction of sanitation facilities

4.5.1. General considerations

Providing adequate sanitation infrastructure and services requires careful planning and selection of appropriate designs for a facility. Designing of sanitation facilities should be part of the initial HCF planning. However, where sanitation infrastructure and services are inadequate it is equally important to plan for construction of new ones or upgrading the existing facilities. As mentioned in the preceding section, two types of toilets are recommended for HCFs depending on the following factors:

I. Facility size and catchment population (with future projections);
II. Type of services being offered at a facility;
III. Availability of reliable water supply;
IV. Level of water table;
V. Soil permeability to determine the depth of pit to be excavated and possibility of contamination;
VI. Presence of supporting sanitation infrastructure such as a public sewer;
VII. Socio-cultural norms of the users;
VIII. Cost of the sanitation infrastructure.

4.5.2. Flushing Toilets

The flushing toilet provides a comfortable, safe and hygienic method of sewage disposal. The force of the water from the flushing mechanism, which is called the cistern, washes the urine, faeces and toilet paper out into the septic tank or sewage system. The flushing toilet consists of a squat or seat on a pedestal pan made of vitreous china or metal and a cistern.

It is important that toilet cisterns work properly all the time. If they do not work, the sewage is left in the toilet pan. Sewage left in toilets will smell bad and will bring flies which can carry disease-causing germs to people. If people keep using the toilet without flushing it, the toilet pan will fill up with faeces and paper and will block.

If the cistern does stop working it must be repaired as soon as possible. However, the toilet can be flushed by pouring a bucket of water into the pedestal pan. This should be done every time the toilet is used until the cistern is fixed.

The most important part is the cistern. This begins the flushing process. Sometimes the cistern is set behind the wall in a duct or cavity to protect it from vandals.[12]

12 Environmental health practitioner manual -TAFE Aboriginal Access and the Kimberley Aboriginal Medical Services Council, 1997

4.5.2.1. Maintenance and hygiene of flush toilets

Flush toilets are not typically designed to handle waste on site. Instead, their drain pipes are connected to waste conveyance and waste treatment systems.[13] For maintenance and hygiene purposes the following practices are recommended:

(i) Users of flush toilets should be reminded through a visibly displayed poster that they must flush and leave the toilet clean after use;

(ii) The cleaners should clean the flush toilet with a toilet brush and detergents;

(iii) There should be a cleaning schedule that shows the cleaning time and a supervisor's verification column that is signed to indicate monitoring for cleanliness;

(iv) Periodic checks on effective functioning of the flush toilets in the HCF should be carried out to identify any mechanical faults especially the blockage of wastewater flow due to the faulty cistern mechanism;

(v) Since in many cases flush toilets are located within the buildings, rectification of such faults should be done immediately otherwise flies could be easily attracted within the premises of the HCFs. Rectification is also important to avoid bad smell from blocked toilets;

(vi) Bed pans should be immediately cleaned and disinfected after being used by the patients.

Water Usage:

The amount of water used by conventional flush toilets usually makes up a significant portion of personal daily water usage in HCFs especially those with relatively high numbers of HCWs, patients and carers. It could be as much as 50 liters per person per day if a person flushes the toilet five times per day with 10 liters per flush. It is recommended that HCFs should opt for modern low flush toilet designs, which allow the use of much less water per flush that range from 4.5 to 6 liters per flush.

4.5.3. Ventilated Improved Pit Latrines

The VIP latrine is an improvement over the simple dry pit latrine. The distinctive feature that gives the VIP latrine its name is the vent pipe installed into the pit, which is used to exhaust the foul odour from the pit and control flies (Figure 4-6).

13 The national guidelines for water, sanitation and hygiene in health care facilities – The United Republic of Tanzania, 2017

The principle is that a continuous flow of air comes in through the superstructure and enters the pit through the hole. This cold air will go down into the pit displacing (pushing up) the hot smelly air upward through the vent pipe. The other advantage of the vent is controlling flies. Dry pit latrines potentially serve as breeding places for flies. Newly-emerging adult flies will try to escape through the vent pipe because the pipe allows sunlight to enter into the pit and flies are photopositive (meaning they move towards light) by nature. A mesh screen tied at the top of the vent pipe will prevent flies from escaping to the outside of the latrine.

The vent pipe should have an internal diameter of 110–150 mm and reach more than 500 mm above the highest point of the roof. The vent works better in windy areas but where there is not much wind its effectiveness can be improved by painting the pipe black. This makes the vent pipe warmer and the heat difference between the pit (cool) and the vent (warm) creates an updraft that pulls the air and odours up and out of the pit.

It is very important to ensure that the vent pipe is straight and vertical in order to allow as much light as possible to shine down the pipe into the pit and so attract any newly emergent flies up the vent pipe.[14]

The bottom of the vent pipe should be securely fixed into a hole in the pit cover slab. The vent pipe should be attached to the wall of the superstructure with steel straps or galvanized steel wire. To test the efficacy of the ventilation, a small, smoky fire can be lit in the pit; the smoke should be pulled up and out of the vent pipe and not remain in the pit or the superstructure.

For PVC pipes sandpaper the top of the pipe so there are no sharp edges that will cut the netting. Fix the fly proof netting to the pipe with glue or tie around with galvanized wire or nylon string. An alternative is to make a 'collar' from a cut section of pipe and 'snap' this over the mesh.

The mesh size of the fly screen must be large enough to prevent clogging with dust and allow air to circulate freely. Aluminium screens with a hole size of 1.2–1.5 mm have proved to be the most effective.[15] Inspect the fly screen regularly at intervals of six months or less. Clear any debris from the screen, for example by pouring a bucket of water down the pipe, this will also wash spiders and spider webs into the pit.

The slab should have a smooth surface and slope towards the squat hole to provide easy drainage for urine and water used for cleaning the floor.

The opening or squat hole should not be more than 250 millimetres, so that it is too small for a young child to fall through. A key hole shape with foot rests is ideal. Placement of the foot rests ensures that the user is correctly positioned over the hole. Foot rests are oval in shape and about 300 millimetres long, 125 millimetres wide and 25 millimetres high.

14 TAG Technical Note No.6, United Nations Development Programme Interregional Project, Ventilated Improved Pit Latrines: Vent Pipe Design Guidelines, 1983.

15 WEDC Developing knowledge and capacity in water and sanitation (Guide 27) -Loughborough University, 2014.

Vent pipe:

For the vent pipe to perform efficiently it should be straight without any bends.

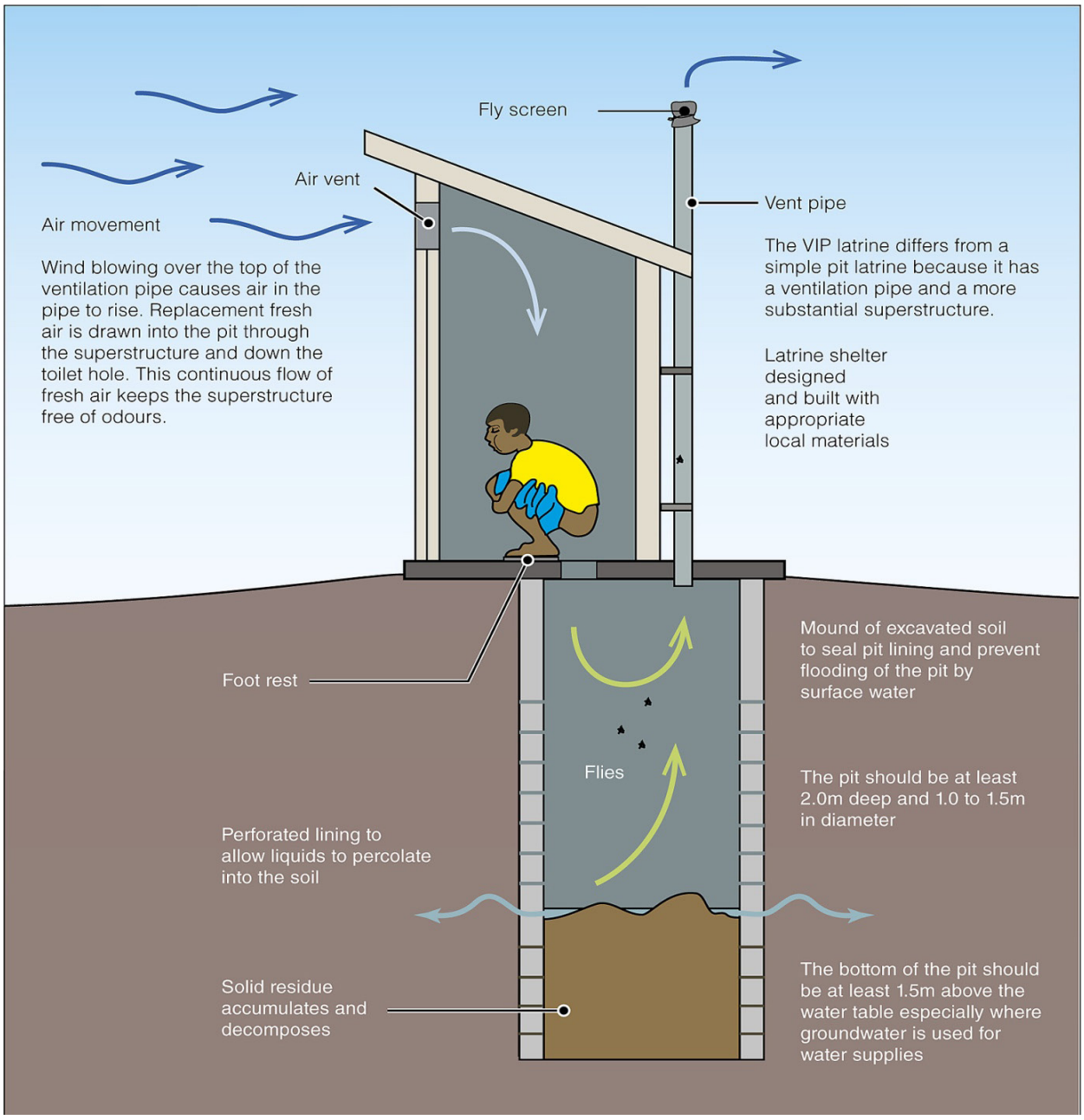

Figure 4.6: A Ventilated Improved Pit Latrine

Source: WEDC Loughborough University, Developing Knowledge and capacity in water and sanitation, Guide 27

4.5.4. Toilet Features for People with Special Needs

Accessible toilets are an absolute necessity for many people living with a disability. A crucial part of inclusive spaces, their design features allow wheelchair users and individuals with a range of (physical) disabilities to use the toilet as independently and safely as possible. Accessible toilets are made for wheelchair users, individuals with mobility impairments, people with bowel and/or bladder conditions, patients with balance issues, grip issues or other conditions that make support rails useful and people with a range of invisible disabilities who also need to use the facilities.

The following are important features of an accessible toilet:

- An accessible door way - Doorways of accessible toilets should be wide enough (at least 1m wide) so that wheelchair users can easily roll in and out. There should be no threshold obstructing the entrance. In addition, the door should always open outwards. This means the door can still be opened easily in an emergency situation;
- Grab rails are a basic feature of any accessible toilet. They provide crucial support, stability and balance for anyone transferring onto the toilet (Figure 4-7);
- A higher toilet seat - For people with reduced mobility, higher toilet seats make it easier to stand up and sit down. By raising the seat of an accessible toilet, transfers to/from a wheelchair are also safer as the seat height is more equal between the two;
- Low mirrors and sinks - Mirrors and wash hand basins in accessible toilets should be placed at a lower height. This makes them useable for anyone seated in a wheelchair;
- The soap, paper towels, hooks, and toilet paper must all be within reach when seated. All amenities in an accessible toilet must be within reach for wheelchair users;
- Easy-to-use tap and bin designs -The tap and bin in an accessible toilet should be an easy-to-use design that doesn't require much force and with a closed fist;
- Space - An accessible toilet has to be spacious enough to turn and manoeuvre in a wheelchair. At minimum, this should involve a clear and unobstructed wheelchair turning circle of 1.5 meters in diameter. The sink should also have adequate space underneath to roll right up to it in a wheelchair;
- Signposting - Signposting with a wheelchair icon is especially important so anyone in need of an accessible toilet knows it exists and knows where to find it.
- Blind people and people with poor vision need to have special grips and guiding systems (ramps) as well as proper lighting for the poor-sighted people;
- Wheel chair ramps should be provided at minimum slope of 1:12.

Figure 4.7: Water borne toilet (seat type) with grab rails for persons with disabilities with a hand washing facility within reach of the user

Source: Kagga & Partners

4.5.5. Vulnerability and adoptability of sanitation facilities to climate change

Climate change is among the major challenges that increase the risk of extreme weather events, such as increase in the strength and frequency of heavy precipitation and floods. Technologies promoted for improving access to sanitation in HCFs are vulnerable to climate-related threats. In places that are susceptible to flooding, the lined pit should be made shallow into the ground and raised above the ground level (Raised VIP latrine).

4.6. Faecal sludge management

Lined VIP latrines and waterborne facilities connected to septic tanks generate faecal sludge when. This has to be safely contained in well-designed sanitation facilities. The lined pits and septic tanks should be designed and constructed with access point for emptying, when vaults are full. Emptying must be included into the operation and maintenance processes and budgets. Safe emptying using mechanized trucks should be practiced on full vaults, at least one week after last user and emptied with workers wearing full PPE. Faecal sludge after safe emptying must be safely transported to a treatment facility in the vicinity, under the operation of trained personnel before environmental disposal.

When the VIP latrine or septic tank has served its design life, it should be decommissioned/ destroyed after safe emptying of contained faecal sludge. At least one week should be allowed before the site is redeveloped.

CHAPTER 5: **HYGIENE PRACTICES IN HEALTHCARE FACILITIES**

5.1. Introduction

Good hygiene practices such as hand washing at critical times, bathing regularly, food handling & storage and use of personal protective equipment are crucial in preventing the acquisition and spread of infectious microorganisms at the health facility. These hygiene practices/behaviours are often simple, inexpensive and highly effective in preventing the spread of disease among patients, caregivers and healthcare workers. The outbreak of COVID 19 has further showed how these simple care practices can significantly reduce the risk of transmitting infectious micro-organisms especially in a health facility setting.

This chapter gives guidelines for maintaining effective hygiene practices within the health care environment which should be adhered to by all HCFs at the different levels in order to minimize risks of contamination. The hygiene practices addressed in this chapter include personal, hand, instrument, bathroom and mortuary hygiene. Guidelines on religious practices, hygiene promotion initiatives, education / communication material approaches and communication channels have been provided.

5.2. Objective

The objective is to promote personal, hand, instrument, facility hygiene and mortuary hygiene practices at the health facilities.

5.3. Personal Hygiene and Safety

Personal Hygiene involves the general cleanliness of the whole body. This includes the hair, the hands, and clothing among other things. The following guidelines should be applied for general body care including healthcare workers, patients and caretakers.

- The hair should be kept short or pinned up, and regularly washed;
- Finger nails should be short and clean;

- Artificial nails and nail vanish should not be applied;
- Beards and moustache should be trimmed short and clean;
- Pubic hair should be shaved off regularly;
- The clothes should be freshly laundered before putting them on daily;
- In case of exposure to blood or body fluids, clothes should be decontaminated before washing;
- Uniforms should be made of materials easy to be washed, and decontaminated;
- Tooth brushing at least twice a day;
- Bathing at least once every day;
- The uniform material should not allow body fluids to seep through easily.

5.4. Hand Hygiene

Hand hygiene is the most effective method of preventing transfer of micro-organisms between personnel and patients within the health care facility. The purpose is to reduce resident and transient organisms. Appropriate hand washing is achieved through using soap, running water and friction. Patients, care takers and health workers should be instructed in proper hand washing before eating, after toilet and when soiled.

5.4.1. Hand Hygiene Practices

Appropriate hand washing is achieved through use of soap, running water and friction. Health workers should wash their hands properly before and after handling patients, equipment or when soiled.

Instructions prior to hand washing:

- *Remove all jewellery, wet hands, apply detergent, use enough friction to cover all areas of your hands.*
- *Hand care: Cover skin lesions and cuts on hands with water proof dressing.*

5.4.1.1. Social or Routine Hand Washing

Wash using soap (non-microbial) and water for 20 seconds to remove soiling or transient organisms from all surfaces of fingers or hands as illustrated in Figure 8-1.

Figure 5.1: Steps for routine hand washing

Source: Optimum medical, 2020.

5.4.1.2. Antiseptic Hand Washing

Wash with water and chlorohexidine, iodine, povidone iodine or chlorproxylenol, trichlosan for 15 seconds to remove transient micro-organisms and reduce flora, from all surfaces of fingers and hands. The steps to be followed while performing antiseptic hand washing are similar to those outlined in Figure 5-1.

5.4.1.3. Antiseptic Hand Rub

Healthcare facilities should make available alcohol rubs (Alcohol - based rub, Ethanol 70-90%, Isopropyl 60-70%, methanol) at points of care and should conform to the national specifications for alcohol-based hand hygiene products. The alcohol rub should be kept in secure place in order to avoid risk of accidental or intentional ingestion at the point of care by individual patient. It should be applied when hands are not visibly soiled in order to decontaminate hands for 20 -30 seconds or until dry and should follow the steps illustrated in Figure 5-2.

Figure 5.2: Antiseptic Hand Rubbing

Source: World Health Organization (WHO) Guidelines on Hand Hygiene in Health Care, 2009.

5.4.1.4. Surgical Hand Antisepsis

Surgical hand antisepsis aims at reducing the number of resident and transient flora to a minimum but also to inhibit their re-growth for as long as possible, not only on the hands but also on the wrists and forearm.

With water and soap, scrub for 2 to 5 minutes rigorously while applying the antiseptic using a single use plastic brush to clean nails and nail beds (brush not recommended routinely) as illustrated in Figure 5-3.

Steps in preparation for scrub procedures

- Remove all personal wear and don theatre attire (theatre dress/ shirt and trouser for men)

- Remove all jewellery e.g. rings, watches, bracelets
- Adjust headwear to ensure all hair is well covered and mask comfortable
- Put on goggles or face shield
- There should be no cuts or infected lesions. In case there are, cover them with occlusive waterproof dressing
- Sleeves must be short to allow scrubbing up to the elbows
- Keep nails short and clean without nail polish

Please Note:

- *Keep the soap and soap dispensers clean;*
- *In case plain soap is used, care should be taken to avoid contamination of the soap and soap dispensers as they may act as reservoirs of bacteria if not cleaned properly between uses.*

Surgical hand washing / scrubbing procedure:

Step 1: Wet hands with water.

Step 2: With hands held above the level of elbows to ensure that water drips from the clean to the unclean area, apply an appropriate amount of hand rub (5mls dose from dispenser i.e. 1 downward stroke action) or a sufficient amount of soap to cover all hand surfaces, work into palms to form lather then comprehensively apply to all areas of fingers, hands, arms to a point 4 to 5 centimetres above the elbows.

Step 3: Rub palms to palms, fingers interlaced for both hands, continue into rotational rubbing back and forth with clasped fingers of right into left and vice versa ensuring that nails and nail beds are cleaned with a single use disposable scrubbing brush. The hands should not be scrubbed to avoid skin damage.

Step 4: After commencement of the scrub procedure, taps and dispensers must only be manipulated using the elbows, foot or knee spray taps (ideal choices). The scrubbing procedure should not take less than 5 minutes.

Step 5: Rinse off the initial wash starting from hands to the elbows and reapplying antiseptic/ soap, the repeat the process above, from fingers up to mid arms for not less than 2 to 5 minutes.

Step 6: Rinse off 2nd wash the lather again starting from hands to elbows, may repeat antiseptic wash by giving a final wash to the hands.

Step 7: Rinse both hands individually, keeping them raised above elbows.

Step 8: With hands still above, open gown pack into the square off surface and take a cotton hand towel, by placing the picking hand on one opposite side behind the towel, while the other also is kept opposite, as in illustrations below (Figure 5-3).

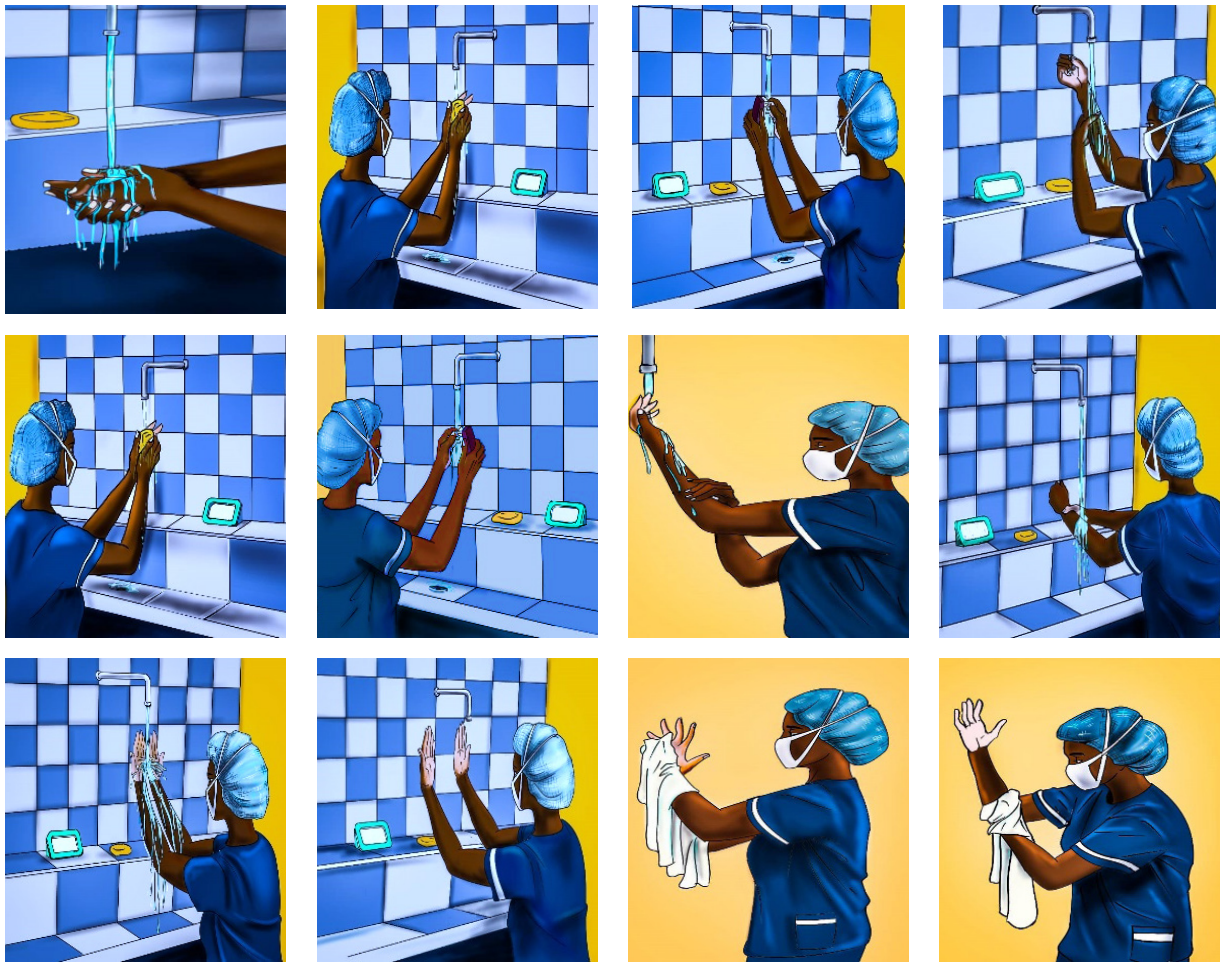

Figure 5.3: Illustration on Steps for Surgical Hand Washing

Source: Kagga and Partners - Guidelines for WASH in Healthcare Facilities, 2021

5.4.1.5. Drying of Hands and Arms after Surgical Scrubbing

The principle of drying hands is to ensure removal of excess water and reduction of bacterial count of all transient micro-organisms.

- Hand drying is an essential part of hand hygiene. Wet hands have high bacterial count and lead to dryness, cracked skin and increased latex allergies, for all drying purposes single use cotton towels are referred to here.
- Keeping the hands higher than the elbows, holding them away from the body and clothing, pick the towel ensuring that each hand comes in contact with one side of the towel. The opposite side of the towel should dry the corresponding hand by blotting the skin dry in a corkscrew motion beginning with the fingers up to the elbow, while the other side will be used to blot the hand that picked the towel from the pack, following the same process. However, if 2 towels are provided discard the first, and using the 2nd towel. Repeat the process for the second hand from fingers to just above the elbow also, before discarding into the laundry basket. (Figure 5.5).
- For each scrubbing procedure, use a separate drying towel once and drop it in the laundry basket for processing.

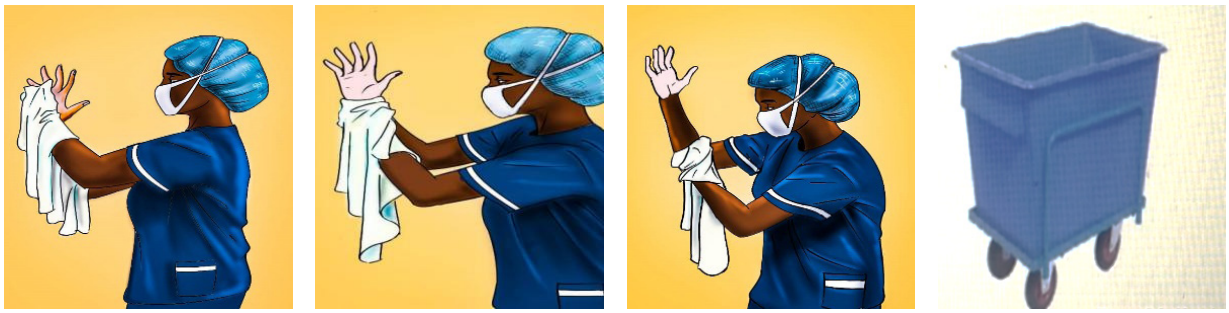

Figure 5.4: Illustration for hand drying using a towel

Source: Kagga & Partners - Guidelines for WASH in Healthcare Facilities, 2021

Please Note:

- *Communal towels have been recognized as sources of cross-infection and should be avoided in clinical practice.*
- *Disposable paper towels or single use (reusable) cotton towels are recommended.*
- *The use of hot air driers is not recommended and should be discouraged in HCFs.*

5.4.2. Hand washing facilities

Hand washing facilities including low cost models (hand washing basins, running water, lever taps among others) should be made available in various locations of the facilities as listed below:-

- At stations near the main entrance/gate of the HCF
- Triage areas
- Medical examination rooms
- Maternity rooms
- Delivery rooms
- Treatment rooms
- Common waiting areas
- Within or at the entry / exit of the toilet
- Breast feeding / nutrition corners
- Catering / kitchen areas
- And any other convenient location determined by HCF In-charge

These should be regularly serviced and maintained to ensure constant availability.

Healthcare facilities should ensure adequate hand washing facilities in order to practice effective hand hygiene. Examples of hand washing facilities are presented in Figures 5-5 and 5-6 where running water is available and Figure 5-7 where running water is not available.

Figure 5.5: Hand washing basin with ceramic bowls

Figure 5.6: Hand washing facility with stainless steel bowl

Figure 5.7: Foot operated Hand Washing Facility

Table 5-1 gives the minimum requirements for hand washing facilities and their locations within the different levels of HCFs while Table 5-2 gives the specifications.

Table 5.1: Desirable requirements of hand washing facilities in HCFs

Health care category	Hand washing facilities
Clinic	1 No. Hand washing facility with drainage system and soak away pit at the following locations: • Entrance to the facility • Triage area • Consultation room • Patients toilets (male and female) • Staff toilet (male and female)
HCII	• 1 No. Hand washing facility with drainage system and soak away pit at the following locations: • Entrance to the facility • Triage area • Consultation room • Patients toilets (male and female) • Staff toilet (male and female)

Health care category	Hand washing facilities		
HCIII	1 No. Hand washing facility with drainage system and soak away pit at the following locations: • Entrance to the facility • Triage area • Consultation room • Laboratory • Labour room • Patients toilets (male and female) • Therapeutic feeding (SAM) area • Kitchen		
HCIV	In-patients Wards	Male general ward	1:5 WHB - bed ratio
		Female general ward	1:5 WHB - bed ratio
		Maternity ward	1:5 WHB - bed ratio
		Pediatric ward	1:5 WHB - bed ratio
	OPD		2 No. WHB
	Treatment room		1 No. WHB per room
	Examination rooms		1 No. WHB per room
	Laboratory		2 No. WHB
	Theatre		2 No. WHB
	Offices		1 No. WHB in each office
	Corridor		1 No. WHB not more than 10m spacing
	Sluice room		1 No. WHB
	Pharmacy		1 No. WHB
	Reproductive and child health section		1 No. WHB
	Kitchen		1 No. Double bowel double drain kitchen sink
	Therapeutic feeding (SAM) area		1 No. Double bowel double drain kitchen sink
	Patients toilets (male & female)		1 No. WHB at the exists

Health care category	Hand washing facilities		
	Patient toilets for the PWDs		1 No. WHB
	Staff toilets		1 No. WHB at the exists
	Staff changing rooms		1 No. WHB in each
	Mortuary		1 No. WHB within the mortuary and 1No. at the entrance
	Other areas		As deemed necessary by the Medical Superintendent
General Hospital	In-patients Wards	Male general ward	1:5 WHB - bed ratio
		Female general ward	1:5 WHB - bed ratio
		Maternity ward	1:5 WHB - bed ratio
		Pediatric ward	1:5 WHB - bed ratio
	Main entrance to the facility		2 No. WHB
	Triage area		2 No. WHB
	Treatment rooms		1 No. WHB per room
	Examination rooms		1 No. WHB per room
	Laboratory		2 No. WHB
	Theatre		2 No. WHB
	Reproductive and child health section		1 No. WHB
	Pharmacy		1 No. WHB
	Mental health section		1 No. WHB
	Central sterilization and supplies room		1 No. WHB
	Sluice room		1 No. WHB
	Offices		1 No. WHB in each room
	Corridor		1 No. WHB not more than 10m spacing
	Kitchen		1 No. Double bowel double drain kitchen sink

Health care category	Hand washing facilities		
	Therapeutic feeding (SAM) area		1 No. Double bowel double drain kitchen sink
	Patients toilets (male and female)		1 No. WHB at the exists
	Patients toilets for PWDs		1 No. WHB
	Staff toilets (male and female)		1 No. WHB at the exists
	Staff changing rooms		1 No. WHB in each room
	Mortuary		1 No. WHB within the mortuary and 1No. at the entrance
	Other areas		As deemed necessary by the Hospital Administration
Referral Hospital	In-patients Wards	Male general ward	1:5 WHB - bed ratio
		Female general ward	1:5 WHB - bed ratio
		Maternity ward	1:5 WHB - bed ratio
		Pediatric ward	1:5 WHB - bed ratio
	Main entrance to the hospital		2 No. WHB
	Triage areas		2 No. WHB in each area
	Treatment rooms		1 No. WHB per room
	Examination rooms		1 No. WHB per room
	Laboratory		2 No. WHB
	Theatre		2 No. WHB
	Pharmacy		1 No. WHB
	Offices		1 No. WHB in each room
	Corridor		1 No. WHB not more than 10m spacing
	Kitchen		1 No. Double bowel double drain kitchen sink
	Therapeutic feeding (SAM) area		1 No. Double bowel double drain kitchen sink

Health care category	Hand washing facilities	
	Reproductive and child health section	1 No. WHB
	Mental health section	1 No. WHB
	Sluice room	1 No. WHB
	Patients toilets (male and female)	1 No. WHB at the exists
	Patients toilets for PWDs	1 No. WHB
	Staff toilets (male and female)	1 No. WHB at the exists
	Staff changing rooms	1 No. WHB in each room
	Central sterilization and supplies room	1 No. WHB
	Mortuary	1 No. WHB within the mortuary and 1No. at the entrance
	Other areas	As deemed necessary by the hospital administration

Table 5.2: Specifications for Hand washing facilities in HCFs

Hand washing Facility	Specifications
Hand washing basin	• Should be made of non-porous material, round shape inside with dimensions of 25cm by 35cm depth and without overflow • Should be of elbow, foot or automatic operating taps, uPVC traps and plastic gadgets • Should be a wall-mounted basin fixed at 120cm above floor
Soap / detergents dispenser	• Should be soap dispenser (manual or automatic)
Hand drying equipment / materials	• Should be a centered feed hand towel dispenser • Hand drying material should be a disposable paper towel
Water supply	• Both hot and cold water should be provided
Sanitizer	• Should be used when hands are visibly clean
Waste bin	• Should be a round black/blue pedal bin of 12 litters (340mm (height) x 270mm (diameter)

Hand washing Facility	Specifications
Hand washing basin for disabled people	• Wheel chair accessible hand wash basin which is wall mounted with dimensions of 510mm (length) by 685mm (width). • Should be of elbow or automatic operating taps.
Hand washing basin for children	• Wall mounted hand wash basin with dimensions 600mm high and 500mm wide.

5.4.2.1. Surgeon Scrub Sinks

Various features of a scrub sink aid in the effective operation and use by surgeons and other surgical staff. The main features of a scrub sink include:

- Digital timer - is used to ensure that the proper amount of time is spent on hand hygiene before entering the operating room. Timers count down from a predetermined start to prevent scrubbing in for less than the desired time.
- Faucet - is an important feature of a scrub set because it delivers the water for the hand scrubbing process. It should offer non-aerated, consistent water flow with either shower head or laminae properties.
- Soap dispenser - a proper dose of surgical scrub chemistry is also important when selecting a scrub sink. The soap is dispensed by a hand pump, foot pump, knee operation or infrared methods.
- Water control - water control on a scrub sink may be operated by hand or automated.
- Station / bay - scrub sinks maybe constructed with one, two or three stations at which multiple members or staff can wash their hands at the same time. Figure 5-8 is an illustration of such type of sink.

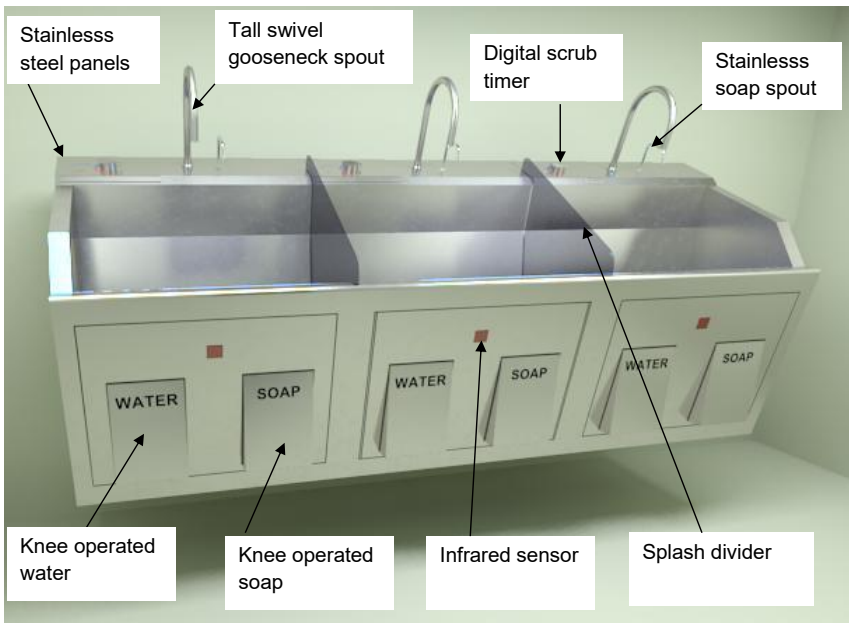

Figure 5.8: A Three bay wall mounting surgical scrub sink

The distance from the ground at which the scrub sink is mounted is critical because it determines the level of decontamination and sterilization.

The scrubbed team should don sterile gowns and gloves in a sterile area away from the main instrument table and in a manner to prevent contamination of the attire.

5.4.3. Critical Moments of Hand Hygiene in HCFs

5.4.3.1. Hand Hygiene in Patient Handling

Care has to be taken before, during and after handling or touching a patient, and in handling food for therapeutic care. Critical moments of hand hygiene (5 moments of hand hygiene) during patient care are illustrated in Figure 5-9. Health care workers must perform hand hygiene at these critical moments as they can easily contaminate their hands at different occasions such as lifting a patient, wound dressing, taking a patient's pulse, blood pressure, or oral temperature, touching a patient's hand, shoulder or groin.

There should be sufficient and functional, hand hygiene facilities to ensure health care workers, caregivers and patients can carry out hand hygiene at all five key moments.

There should be cadres designated to monitor hand washing practices of the visitors to the healthcare facility (See Figure 5-10 and Figure 5-11).

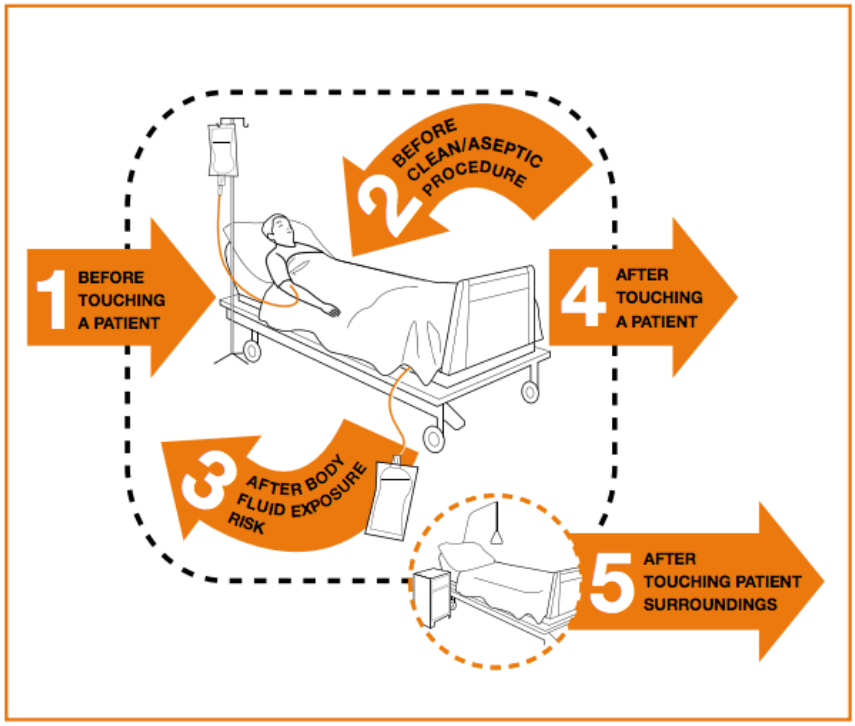

Figure 5.9: Critical Moments of Hand Hygiene in health Care Facilities

Source: Guidelines on Hand Hygiene in Health Care (WHO, 2009)

5.4.3.2. Other Critical Moments of Hand Hygiene

The other critical moments for proper hand washing in HCFs environment include:

- Before entering and leaving inpatient wards or any working area of the health facility setting;
- Before and after feeding a patient;
- After contact with inanimate surfaces and objects in the immediate vicinity of the patient;
- Before preparing food;
- Before and after serving food;
- Before eating;
- After visiting the toilet;
- When hands are visibly dirty, or soiled with blood or other body fluids;
- Before putting on gloves and immediately after removing gloves;
- Before and after caring for any patient.

Figure 5.10: Cadre at HCF main entrance guiding the visitors to a hand washing station before entry to the facility

Source: Kagga and Partners - Guidelines for WASH in Healthcare Facilities, 2021

Figure 5.11: Illustration of cadres monitoring, screening and offering guidance

Source: Kagga and Partners - Guidelines for WASH in Healthcare Facilities, 2021

5.5. Respiratory Hygiene

Respiratory hygiene and cough etiquette is a standard precaution that should be applied by all patients, visitors and HCWs to contain respiratory secretions (e.g. when coughing, sneezing…) to avoid spreading respiratory infections.

Persons with respiratory symptoms should apply the following source control measures:

- Cover their nose and mouth when coughing/sneezing with tissue or mask. If no tissues are available, cough or sneeze into the inner elbow rather than hand;
- Do not "spit" in environment (use tissue instead);
- Dispose of used tissues and masks;
- Avoid shaking hands when sick; and
- Perform hand hygiene after contact with respiratory secretions.

HCFs should promote respiratory hygiene and cough etiquette by:

- Educating HCF staff, patients, family members, and visitors on the importance of containing respiratory droplet/ aerosol and secretions to prevent the transmission of infectious disease (e.g. influenza, tuberculosis, bacterial pneumonia …);

- Placing acute febrile respiratory symptomatic patients at least 1 metre (3 feet) away from others in common waiting areas, if possible;
- Posting visual alerts at the entrance to health-care facilities instructing persons with respiratory symptoms to practice respiratory hygiene/cough etiquette;
- Consider making hand hygiene resources, tissues, masks and rubbish bins available in common areas and areas used for the evaluation of patients with respiratory illnesses.

CAUTION:

If you have respiratory symptoms (e.g. coughing), consider using a mask, or seek permission to stay home from work, or performing office duties away from patients.

5.6. Instrument Hygiene

Instrument hygiene is very important in-patient safety. It involves decontamination, cleaning of equipment, high level disinfection or sterilization and storage.

5.6.1. Cleaning

Cleaning is the single most step in making a medical device ready for re-use. Further processing (disinfection and sterilization) of equipment that does not include cleaning can fail because microorganisms can be protected inside the residual organic matter. In practice, cleanliness is based on visual inspection, whether the instrument is visibly clean.

5.6.2. Disinfection

Disinfection is the process destroying or inhibiting disease producing microorganisms outside the body. It is the first step in processing equipment that has been in contact with blood and body fluids but it is also used for items that cannot undergo the sterilization process. The process involves using various chemicals.

5.6.3. High-Level Disinfection (HLD)

High level disinfection is the process that eliminates all microorganisms except some bacterial endospores from inanimate objects by boiling, steaming or the use of chemical disinfectants.

5.6.4. Sterilization

Sterilization is a process that eliminates all microorganisms (bacteria, viruses, fungi and parasites) including bacterial endospores from inanimate objects by high-pressure steam (autoclave), dry heat (oven), chemical sterilants or radiation.

The guidelines on instrument hygiene processes are presented in Table 5-3.

Table 5.3: Guidelines on Instrument Hygiene Process

Process	Procedure	Applies to
Decontamination	Soak in 0.5% chlorine solution for 10 minutes only	All contaminated instruments and other materials
Cleaning	Soap, scrub brush, clean water Scrub and remove all tissue, blood, and waste material	All instruments after decontamination and before further processing (sterilization or HLD) or dried and stored.
Sterilization	Steam (autoclave at 121°C, 106kPa, 30 minutes) Dry Heat (160°C, 2 hours) Chemical (cidex - 2% gluteraldehyde – 10 hours; rinse with sterile water)	For all surgical instruments and equipment For reusable surgical gloves
High-level Disinfection	Boiling – 20 minutes (rolling boil) Steam – 20 minutes Chemical – 20 minutes; rinse with water that has been boiled for 20 minutes	The only acceptable alternative to sterilization

Adapted from the Uganda National Guidelines on Infection Prevention and Control Guidelines, 2013

5.7. Food and Kitchen Hygiene

Kitchen area plays an important role in the prevention of infection. The objective of these guidelines is to minimize the risk of disease transmission and promote good hygienic practices in the processing of food at the health facility. Cleanliness and safe food preparation and storage practices are critical to:

- Preventing outbreaks of food borne illness among patients;
- Minimizing microbiologic contamination of food by using appropriate food handling techniques during the preparation of food; and
- Protecting food from contamination by insects, rodents and moisture.
- Providing good nutritional quality food to patients, in relation with their disease (e.g. diabetes) to increase their immune defence and prevent them from infection.

5.7.1. Kitchen Hygiene

The processes of handling and preparing food at the hospital for patients are very crucial in order to prevent infections and outbreak of diseases. This becomes more important in the hospital kitchen environment where the tendency for infection is high due to the presence of patients suffering from various sicknesses and infections.

To ensure proper food hygiene is practiced at the HCF, the following requirements presented in Table 5-1 should be adhered to:

Table 5.4: Minimum requirements for food hygienic practices

Hygienic practice	Requirements
Chef attire	• Wear prescribed protective uniform such as water proof or fabric aprons; Should be changed daily; A minimum set of 3 clothes for each worker to ensure adequate rotation • Cover hair during food preparation • Do not talk while cooking
Working environment	• Keep floor and working tops clean and dry • Do not run in the Kitchen
Food handling	• Wash hands before handling food or utensils and wear plastic gloves when appropriate • Do not expose food to the environment • Keep fingernails short and unpolished • Cooked food should be kept in a food warmer before serving
Kitchen facilities	• Must be with adequate supply of hot and cold water and adequate facilities for cleaning, disinfecting and storing utensils and equipment • The facilities should be made of corrosion-resistant materials for ease of cleaning • Clean equipment, crockery, and utensils immediately after use in warm soapy water • Wash all surfaces used for cutting or slicing food with a detergent for dishes and water (hot water is best). Use a hard brush to remove difficult particles and stains. Rinse with fresh water. • Keep floor and working tops clean and dry
Food waste handling	• Food waste and other rubbish should be put in containers that can be closed and these must be of appropriate construction, kept in sound condition, be easy to clean and where necessary, to disinfect.

It is recommended that the management of the health care facility ensures regular supervision over the HCF's kitchens. This would help to identify non-compliant practices.

In addition, the hospital management should plan for periodic training on all aspects of hygiene and food safety for staff members of the kitchens. This would help to enhance their knowledge and refresh their memories on practices of food hygiene.

It is recommended that in health facilities where patients' food is prepared by relatives there is access to proper hygienic equipment (cooking stoves, water, sinks, etc). Educate relatives in food safety.

5.7.2. Food Handling and Preparation

Food handlers should be trained in basic food safety.

All food must be handled and prepared with utmost cleanliness.

Food handlers must wash their hands after using the toilet and whenever they start work, change tasks, or return after an interruption. Soap and water should be available at all times during food preparation and handling, to ensure that hand washing is convenient.

If kitchen staff and carers have colds, influenza, diarrhoea, vomiting or throat and skin infections, or have suffered from diarrhoea and vomiting within the last 48 hours, they should not handle food unless it is packaged. All infections should be reported, and sick staff should not be penalized for reporting infections.

Food-preparation premises should be kept meticulously clean. Surfaces used for food preparation should be washed with detergent and safe water and then rinsed, or wiped with a clean cloth that is washed frequently.

Scraps of food should be disposed of rapidly, because they are potential reservoirs for bacteria, and can attract insects and rodents. Refuse should be kept in covered bins and disposed of quickly and safely.

Eating utensils should be washed with hot water and detergent immediately after each use, and then air dried. The sooner utensils are cleaned, the easier they are to wash. Drying cloths should not be used, as they can spread contamination.

Food should be protected from insects, rodents and other animals, which frequently carry pathogenic organisms and are a potential source of contamination of food.

5.7.3. Separation of food and equipment

Separate equipment and utensils, such as knives and cutting boards, should be used for handling raw foods or they should be washed and sanitized in between uses.

Food should be stored in containers to avoid contact between raw and prepared foods.

Raw meat, poultry and seafood should be separated from other foods.

5.7.4. Cooking and Serving

All parts of foods cooked must reach 70°C to kill dangerous microorganisms.

To ensure this happens, soups and stews should be brought to the boil and meat should be heated until juices are clear, not pink.

Cooked food must be reheated thoroughly to steaming hot all the way through.

Cooked food to be served should be kept hot (more than 60°C) before serving.

Processed food stuffs must be prepared and or served according to the manufacturer's directions. Processed food stuffs should not be used beyond its expiry date. Expired food stuffs should be disposed of in a safe manner that is not accessible to persons and animals.

5.7.5. Food Storage

Cooked or perishable food should not be left at room temperature for more than two hours, and should be prepared or supplied fresh each day. All food should be kept covered to protect it from flies and dust.

Non-perishable foods should be stored safely in a closed, dry, well-ventilated store and protected from rodents and insects. They should not be stored in the same room as pesticides, disinfectants or any other toxic chemicals. Containers that have previously held toxic chemicals should not be used for storing foodstuffs.

Bought food should not be used beyond its expiry date.

Food should be protected from insects, rodents and other animals, which frequently carry pathogenic organisms and are a potential source of contamination of food.

5.7.6. Washing and use of Water

Only safe water should be used for food preparation, handwashing and cleaning.

Fruit and vegetables should be washed with safe water. If there is any doubt about the cleanliness of raw fruit and vegetables, they should be peeled.

5.7.7. Management of Acute Malnutrition/Nutrition Area

The basic hygiene/WASH information for integrated management of acute malnutrition/nutrition area are as follows:[16]

- Provision of water and sanitation services in nutrition centres should be prioritized wherever WASH services are implemented within the health system;

16 Guidelines for Integrated Management of Acute Malnutrition in Uganda, 2020

- Feeding centres and distribution sites should include access to safe water for drinking, as well as clean water and soap for handwashing;
- Wash hands and sterilize equipment and utensils, clean and disinfect the work surface Wash equipment and utensils thoroughly with soap and hot water if sterilization is not possible;
- Wash your hands before preparing the food and before feeding a child. Wash the child's hands;
- Feed baby using a clean cup and spoon, never use a bottle as this is difficult to clean and might cause baby to get diarrhoea because of contamination;
- Cook food thoroughly or re-heat it thoroughly;
- Keep food at safe temperatures; and
- Wash hands before and after touching the baby or breast feeding.

5.7.8. Other Food Service Hygiene Practices

Other food hygiene practices are listed below:

- Wash hands before handling food or utensils and wear plastic gloves when appropriate.
- Wash hands and clean nails after:
    - Arrival to handling area
    - Using the toilet
    - Handling any foods
    - Having contact with unclean equipment and work surfaces, soiled clothing and dishcloths
    - Removing gloves
    - After having contact with patient care area, and patient, family member
- Hands and fingers should be kept away from hair and face where food contaminant organisms can be picked up and transmitted to food.
- Tongs, forks and spoons should be used when preparing foods to minimize hand contact. Cracked and chipped crockery should be discarded.
- Use different utensils between raw food and cooked food;
- Food should not be tasted with ladle or spoon used in food preparation. Utensils used for tasting should be thoroughly washed between tastes, or disposable utensils used;
- Work areas, surfaces and utensils must be cleaned between different preparation tasks;
- Do not cut or prepare food on the ground – use worktops
- Food service staff must have clean fingernails. Wearing rings and nail polish should be discouraged.

- Staff suffering from diarrhoea should be immediately removed from handling food and contact with patients until all symptoms are fully over for 24–48 hours.
- There should be mandatory screening of those preparing food for patients;
- Clean up worktops and equipment properly before, during and after food preparation;
- Serve food as soon as possible after cooking as bacteria are developing quickly in the hot and humid climate (not longer than two hours after preparation, store and serve food at the correct temperature.)
    - Store between 2 – 4 degrees Celsius in the refrigerator.
    - If no refrigerator is available, serve the meal, and do not keep the leftover meal.
- Use correct handling and storage techniques for garbage containers and washing containers after emptying;
- Do not allow any animals into the kitchen at any time;
- Routine fumigation must be carried out for eradication of rodents and insects that would contaminate and destroy food stuffs;
- Keep food away from flies and other insects;
- The kitchen should be far from waste storage and disposal areas and toilets.

5.8. Bathroom Hygiene

Bathrooms play an important role in the prevention and control of disease transmission in HCF. It is crucial for HCFs to have bathrooms commiserate to the HCF bed and staffing capacity at a ratio of patient per bathroom as recommended in Table 7-2.

A proper bathroom within the HCF should have the following basic qualities:

- Provide privacy
- Constant cold and warm water
- Shower
- Separate male and female bathrooms
- Adequate lighting for safe use at night
- Clean and regularly maintained
- Hand wash basins with running water, lever taps and a mirror
- Waste bins for proper menstrual hygiene management for ultimate treatment and disposal in gazetted areas
- Good drainage
- Clear paved paths
- Illustrated signage

5.9. Mortuary Hygiene

Hospital mortuaries can be a source of infections. This section gives guidelines on precautions and maintenance of hygiene in the mortuary.

Precautions in maintaining mortuary hygiene:

- Wear appropriate personal protective equipment like gloves, gowns, plastic aprons, boots and protective eye wears, face masks.
- Disinfect used instruments with Hypochlorite 0.1%;
- Wash equipment with detergents and water, rinse with warm water as laid down by the National Infection Prevention and Control guidelines 2013;
- Wash hands thoroughly with soap and water, and disinfect them with 70% alcohol;
- Disinfect rooms daily with phenolic compounds;
- Where possible UV light should be installed;
- Decontaminate surfaces where blood or body fluids have occurred using chlorine releasing agent;
- Bodies should be stored in a functioning refrigerator and must be maintained at a temperature between 2 to 6°C;
- Changing rooms with shower facilities should be provided at the Mortuary;
- Hepatitis 'B' virus and TT vaccines should be provided to all mortuary staff;
- Health care waste must be handled and disposed of according to the colour coding stipulated in Chapter 8 of this guideline;
- Unclaimed corpses should be placed in body bags following prevailing SOPs and buried in the city/municipality cemetery after seeking guidance and permission from the police and the city/municipality authorities. This should be done after making announcements over the radio for the corpses to be claimed. The HCFs should endevour to keep on file as much detail as possibly available about the deceased in case of claims that may arise in future.

5.10. Religious practices

Where piped water supply is available, bidet showers should be installed in the toilets to cater for religions that use water for anal cleansing.

Where piped water is not available, use of water containers such as jerry cans or bottles are recommended.

5.11. Hygiene Promotion

Improving hygiene is heavily influenced by the existence of appropriate and adequate facilities coupled with tailor made hygiene promotion initiatives that are cognizant of the audience

attributes and aspirations. These may include education levels, prevailing traditional and cultural norms, duration of stay at the health facility a strong desire to heal and leave the hospital among others. The insights derived from audience participation can provide individual audience views of the benefits /motivations and preferred channels of communication of safer hygiene practices. The developed messages should have a clear call to action and be placed in appropriate channels to effectively reach the key three audiences (patients, care givers and health workers).

Availability of adequate financial and human resource to implement the hygiene promotion initiatives is also critical for successful hygiene promotion.

5.12. Information Education and Communication Material

Information education and communication (IEC) material to include the following approaches as appropriate:

5.12.1. Posters Placed at Eye Level of Hygiene Facility Points

Posters should be developed to communicate simple messages to the HCF audiences especially patients, care givers and visitors. The posters should be developed in consultation with the intended audiences. It is important to note that the posters are less likely to change sanitation and hygiene behaviors on their own but as a part of multiple behavior change interventions. The poster messages shall be displayed pictorially, supported with a limited number of words. Images should be realistic and true to scale, clearly showing the chosen action. Materials should be pre-tested locally to ensure the pictures and texts convey the correct message. The posters should be displayed at eye level in strategic places (hygiene facility points), where they can be viewed by the maximum number of intended audiences.

5.12.2. Design Sanitation and Hygiene Nudges

Nudges shall be designed and incorporated in the sanitation and hygiene facilities at the health facility (Figure 5-12). Sanitation and hygiene choices will be presented in a way that makes the intended audiences more likely to pick the option desired action. This aims at changing people's behavior by convincing them of the desired action in a gentle and subtle way. For instance, the floor between the toilet and the hand washing sink can be given a treatment of brightly colored arrow-shaped stickers or molds directed towards the sinks. This is intended to produce the notion that people should follow the arrows and use the sinks after having used the toilet.

Figure 5.12: Examples of hand washing nudges

5.12.3. Hygiene Promotion Session Guide

What are the WASH practices that can help improve our health?

(i) Safe excreta disposal
(ii) Personal hygiene
(iii) Solid waste management at the point of generation
(iv) Hand washing at four critical times

- Before preparing food
- Before eating
- Before cooking
- Before serving and after serving food
- After washing child bottom or performance of any cleaning job
- After toilet use

5.12.4. Painted talking walls

Large murals can be painted on walls of the HCF. This is affordable, effective and sustainable because it is long lasting compared to posters.

5.12.5. Facility user Instructions to Promote Appropriate use and Maintenance of Facilities

With the rapidly evolving technologies the sanitation and hygiene facilities used in HCFs such as flushing toilets, water borne hand washing facilities, soap dispensers among others are new to various HCF clients. As such it is important that clear instructions with the help of diagrams on how to use these facilities should developed and displayed to foster proper and effective use of these facilities. Proper use also contributes to a reduction of break down and maintenance of the facilities. Examples of messages include:

(i) Sit on the toilet - do not stand on it', and 'please flush with your hand and not your foot;

(ii) The sinks are for washing your hands only – do not use for washing clothes, bed Lenin or scrubbing your shoes which may damage the basin;

(iii) Use toilet paper. Do not use other materials such as papers, stones which may block the toilet drainage;

(iv) Do not dump sanitary material into the toilet. It will block and flood the toilet. (Figure 5-13)

Figure 5.13: Examples of Illustrated use of WASH Facilities

5.12.6. Pretesting the messages and materials

To ensure whether people are likely to pay attention to the information, education and communication (IEC) materials and the messages they include, understand them correctly and find them motivating, they should be first pretested. The best way is to ask the people for whom they were designed for their opinion concerning some of the following "quality factors".

- **Comprehension:** Ensure that the people understand the main point(s) and that every image, illustration and words used are easily understandable by the audience.
- **Relevance:** Ensure that people feel that the materials were made for them. The information should be in their own HCF lives even outside the HCF.
- **Noticeability:** The materials should attract people's attention and easily noticeable. e.g. the type of colours used should be attractive.
- **Memorability:** The materials messages should be easy to memorize after having seen them once.
- **Credibility:** The content of the message and source should be trustable.
- **Acceptability:** the material should not be offensive to the culture.

- **Knowledge, attitude or belief change:** The exposure to the material used should aim at imparting knowledge to learn new practices and should motivate them to act accordingly or do something. People should be prompted after being exposed to the materials whether they think that they have learned anything new or it motivated them to do something.
- **Strong and weak points:** Respondents should be asked about the best things about the materials and if they had to change something what would it be.

5.12.6.1. When Conducting Focus Group Discussions

In conducting focus group discussions, the following should be taken into consideration:

- Make sure that everyone can see or hear the material or media you are assessing;
- Rotate the order in which you present different versions of the materials in each focus group;
- Ask for a general reaction first before you start asking about specific details;
- If you need to decide between several graphics, show people the pictures by themselves without the text and ask what message they think the graphics convey;
- After showing all versions, you can ask people to rank them in order of preference;
- Encourage critical feedback if only positive feedback is being given.

You may not need to address all the feedback you receive: some may be irrelevant. Pretesting the materials with more people can help you to identify which issues are coming up repeatedly and are worth your attention.

5.13. Communication Channels

5.13.1. Small ward/group meetings

Small ward/group meetings of about 2 to 15 people shall be conducted for sanitation and hygiene promotion.

Conduct sanitation and hygiene promotion small group meetings of patients and care givers upon admission to facilitate the adoption and reinforcement of positive sanitation and hygiene perceptions, beliefs, expectations, and behavior patterns. The meetings should be conducted for all the new patients and care givers as part of the patient admission process and during triage waiting time for outpatients.

Subsequent follow up meetings should be held by the ward in charges on a weekly basis by the most senior (longest stay) care giver in every ward.

5.13.2. Demonstrations

Long-term care givers, facility hygiene and promotion staff should conduct demonstrations on the use of sanitation and hygiene facilities such as the flush toilet, hand washing facilities and showers.

5.13.3. One on one sessions

Health workers, long-term care givers, facility hygiene and promotion staff should conduct one on one session in the ward, during dump dusting and ward rounds.

CHAPTER 6: **INFECTION, PREVENTION AND CONTROL**

6.1. Introduction

This section of the guideline has been put in place and is to be applied in conjunction with the National Infection Prevention and Control Guidelines 2013, which was very comprehensively put together and was also designed to be used alongside the Policies and Procedures MOH 2005, IPC MOH 2004, PEP for HIV, Hepatitis B and C, Infection Safety and Healthcare Waste Management, TB Infection Control (TB-IC) guidelines among others, as stipulated.

Precisely, IPC is the establishment and implementation of policies and procedures and the education and monitoring of staff adherence to preventive procedures to reduce infection among patients, staff and visitors.

For more details on COVID 19 guidelines please refer to The National Guidelines for COVID19 - MOH Uganda, April 2020.

The main objectives of a safe and reliable IPC is to:

- To ensure patient and healthcare worker safety through ensuring adherence to proper infection control protocols;
- To upgrade and develop WASH structures complimentary to IPC;
- To build IPC and WASH capacity among staff, patients and caregivers.

Inappropriate provision and use of WASH facilities can directly affect human health, the environment and society in various ways including but not limited to:

- Disease transmission;
- Pollution;
- Effects on access to healthcare;
- Compromised nutritional care to prevent/control infection.

6.2. Types of Diseases

All forms of disease can be transmitted within healthcare settings hence generally referred to as Health-Care Associated Infections (HCAI). These spread from patients to health worker and vice versa or patients to caregivers in the absence of proper mitigation structures.

6.3. Modes of Disease Transmission

The various modes of transmission resulting from inappropriate use of WASH are but not limited to:

- Spread through body fluids or blood;
- Person to person;
- Contaminated objects (instruments, equipment, surfaces);
- Air borne;
- Through contaminated water.

The main objective of IPC and WASH in healthcare facilities is to break these disease transmission cycles.

Infection Control Criteria in HCFs:

- *Safe working environment for various activities carried out in the HCFs;*
- *Diligence in the execution of laid down due procedures and processes in these guidelines and any other duly approved practices; adhering to IPC Protocols and rules of aseptic procedures*
- *Safe management and disposal of waste in all its forms;*
- *Clean and proper usage of objects including instruments, equipment, surfaces, linen etc;*
- *Water used in a HCF must be clean portable water meeting UNBS standards;*
- *High standards of personal hygiene and conduct.*

6.4. Composition of the IPC Committee

Recommended composition of the IPC committees at the different levels of the HCFs is presented below:

National Referral Hospitals

I.	Senior Microbiologist/Surgeon/Physician	Chairman
II.	Pathologist	
III.	Surgeon	
IV.	Hospital Administrator	

V. Senior / Principal Nursing Officer I/C Infection Control Focal person/Secretary
VI. Pharmacist
VII. Dental Surgeon
VIII. In-charge Nursing Services
IX. Nursing Officer Maternity Ward
X. Head Laboratory Services
XI. In-charge Theatre
XII. In-charge ICU
XIII. In-charge Outpatient Department
XIV. In-charge Cancer Institute
XV. Environmental Health Officer
XVI. Nutritionist
XVII. Technician Operation and Maintenance
XVIII. Representatives from all wards
XIX. Representatives from Contractor Waste / Cleaning Management
XX. Representative from hospital management committee

Hospital Infection Control Committee Composition in a Regional Referral Hospital

I. RRH Hospital Director - Chairperson
II. District Health Officer
III. Dental Surgeon
IV. Hospital Administrator
V. Infection Control Nurse- Focal person/Secretary
VI. Senior Nursing Officer In-charge
VII. Principal Health Inspector (PHI/SEO- EHD)
VIII. Senior Laboratory Technician
IX. In-charge Theatre
X. In-charge Maternity Ward
XI. In-charge NICU
XII. In-charge Casualty Representative from all Wards
XIII. Environmental Health Officer
XIV. Nutritionist
XV. Member of Community Health Water Committee
XVI. Representatives from Contractor Waste / Cleaning Management
XVII. Representative from hospital management committee

Hospital Infection Control Committee Composition in a General Hospital

I. Medical Superintendent - Chairperson
II. District Health Officer
III. Dental Surgeon
IV. Hospital Administrator
V. Environmental Health Officer
VI. Infection Control Nurse - Focal person/Secretary
VII. Senior Nursing Officer In-charge
VIII. Senior Health Inspector (SHI/EHO-EHD)
IX. Senior Laboratory Technician
X. In-charge Theatre
XI. In-charge Maternity Ward
XII. In-charge NICU
XIII. In-charge Casualty
XIV. Representative from all Wards
XV. Member of community Water Committee
XVI. Member of Community Health/Water Committee
XVII. Representatives from Contractor Waste / Cleaning Management
XVIII. Representative of the hospital management committee

Hospital Infection Control Committee Composition in a Health Center IV

I. Medical Officer In-charge - Chairperson
II. Nursing Officer
III. Infection Control Nurse - Focal person/Secretary
IV. Clinical Officer
V. Laboratory Technician
VI. Health Inspector (HI – EHD)
VII. Environmental Health Officer
VIII. Theatre Assistant
IX. Member Health Unit Management Committee
X. Public Health Dental Officer
XI. Representatives from Contractor Waste Management/ Cleaning Services
XII. Representatives from Health Centre III and II
XIII. In-charge Maternity
XIV. Member of health unit management committee

Hospital Infection Control Committee Composition in a Health Centre II and III

I. Manager/Leader - Chairperson
II. Nurse - Focal person/Secretary
III. Health Assistant (HA- EHD)
IV. Wash Technician (community)
V. A Member Community Health Water Committee
VI. Cleaner (maintenance)
VII. A female representative from the community served
VIII. Member of the health unit management committee
IX. All the other staff are members of the committee

VERY IMPORTANT:

- *It is recommended that the Environmental Health (Health Inspectorate) of each healthcare facility as well as the assigned community shall be responsible for ensuring compliance of the guidelines and plan frequent in-service training programmes for staff, patients, visitors and society as in the PILS (Performance Improvement through Learning on Sanitation), this will be used to teach good practices, change bad habits, and demonstrate new equipment or procedures.*
- *Whereas the District Health Officer shall be the Overall Accounting Officer in matters pertaining to effective, efficient and affordable quality health service in the district, the Environmental Health Officers shall be the Implementers as stipulated in the Public Service Act, PHI manual Chapter 1, the and PILS respectively.*
- *At National level the technical working group in collaboration with Environmental Health Department at the MOH, the Local government and the administrative bodies at all levels such as may be identified as lacking appropriate representation, shall appoint an equivalent substitute or restructure the existing employment hierarchy in order to fill up the gaps and enhance sufficient service delivery.*

- All HCWs should be trained to.
  - Understand how infection spreads in the healthcare facility;
  - Know the important role of each staff member plays in preventing infection;
  - Know early signs and symptoms of common nosocomial infection; and
  - Be able to describe or demonstrate various methods of preventing the spread of micro-organisms.
- It is important for healthcare workers to also provide education to the caregivers on IPC measures so that they are best able to protect the patient and themselves, other patients and healthcare workers from infection.

CHAPTER 7: **HEALTH WORKER PRACTICES**

7.1. Introduction

There is a clear health worker crisis in Uganda which is characterized by inadequate skill-mix, uneven geographical distribution, less health worker motivation, attraction, retention and attrition rates.

According to the Uganda Annual health sector performance report 2014/2015, Uganda had a total of 81,892 health workers employed in the health sector, of which 4,811 were medical doctors accounting for 6 percent, while according to SEED Global Health 2020, nurses and midwives contribute 75 percent of the total health work force. Without going into the details of the other categories, the numbers captured are way below the required capacity as critical staff in patient care without considering other multiple tasks rendered let alone working long hours with the subsequent negative effects.

Healthcare associated infections have been identified as a major challenge of modern medicine and remain a major health concern around the globe. Hands of health care workers are potential vehicles for transmission of pathogenic organisms within the health care environment.

Whereas hand washing is widely accepted as the one most effective measure in prevention of HCAIs, between health personnel and patients within the HCF, yet the practice per say before and after patient examination bare very significant differences across the globe amongst the various categories of medical cadres, being found highest among trainees especially nurses, and remarkably high over 90 percent across all staff especially after contact with blood, its products and medical equipment.

Health care workers don't underscore the significance of hand washing though they tend to practice suboptimal levels of compliance, majorly washing after patient care than before.

7.2. Objectives

- To relate health workers activities and practices in regard to WASH at the health care facilities, in order to guide implementation for infection prevention and control.
- To advocate for professional capacity building so as to improve service delivery

7.3. Needs assessment for WASH

There are many people involved in the provision of WASH services from planning, construction to maintenance but health workers, technicians, operators and facility administrators are considered the front-line WASH workers without whom or if inadequately trained and not undertaking their daily tasks effectively, access to WASH services and facilities will be restricted, reduced or even broken down at worst.

Another group of health worker who are crucial are Village health Teams (VHTs) who are trained to promote preventive health care services, under take community outreach activities, conduct house to house visits and provide important information, knowledge and skills on important health related topics grouped into three areas i.e.

I) Disease prevention and control
II) Family health
III) Hygiene and environmental sanitation

7.4. Health-care Practices Related to WASH

The health-care practices related to WASH include but not limited to;

I) Excreta disposal - they provide information and guidance on how human excreta can be safely managed and disposed of, through appropriate use of available sanitary facilities;
II) Water supply safety measures – They relay information regarding contaminated water as a major cause of transmission of water borne diseases that cause diarrhoea;
III) Control of rodents and vectors - by teaching possible methods of control and prevention of breeding;
IV) Delivery of Covid 19 preventive messages to families and the community;
V) Food hygiene and safety measures;
VI) Reporting of deaths in communities to district health teams for follow up.

7.5. Role of VHTs

VHTs promote all these recommended practices by ensuring that they are implemented at household level, in communities through involvement of associations.

Borrowing from Ethiopia, there are Health Development Armies which are organized groups of families that help promote health activities and behaviours among families. HEWs facilitate the establishment of these teams and collaborate with HCFs to provide trainings for the team leaders.

Also, in Ethiopia are private operators who play an important role as frontline workers in making WASH services accessible to communities, doing works ranging from providing household treatment chemicals, sanitary pads, soap, hired technicians for maintenance services and minor

O&M in small towns, collection of solid waste, solid waste transportation and disposal, emptying of septic tanks etc. while the public sector shifts focus to regulation of the services.

Facilitation, practice and initiating sustainable change to improve WASH services requires a full understanding of the existing situation, the barriers to improvement and the available resources.

Commitment for change should come from the communities - change should not be imposed. Frontline workers should be trained to attain a specific managerial skill that renders the process of facilitation. A skill to direct and guide through meetings, discussions, training and planning sessions so that they reach a consensus.

With the growing populations, the rural-urban shift or migrations, the emerging highly communicable and mutant pathogens among others, there could be a need to borrow a leaf here and there and connectivity to the health sector increased as related to in the Third National Development Plan (NDP III). VHTs could be given a little more assignment like, solid waste and domestic waste water disposal where they discuss health and environmental issues caused by solid and waste water produced at household level, their risks to community health and how to safely manage it. A healthy home and environment - through demonstrations, personal hygiene - by promoting the importance of keeping and maintaining good personal hygiene particularly emphasizing hand washing, how to use modern technology equipment etc.

7.6. Health Workers Daily Routines

Health worker practices are intertwined among their responsibilities to patients. They are tailored to meet the unique needs of patients and communities served, though they tend to depend on the various factors such as, education, training, lived experience, experience working with specific populations and vulnerabilities, the prevailing circumstances.

In regards to WASH, health workers daily routines include:

- Educate healthcare providers, care takers, patients and other stakeholders about health needs;
- Conduct preventative and curative services that involve contact and generation of waste ;
- Operate relevant WASH equipment;
- Conduct and supervise WASH activities;
- Orient all patients, carers in regard to all WASH facility use, operation and maintenance;
- Provide culturally, physically and socially appropriate health education on topics related to WASH;
- Collect data and relay information to stakeholders to inform programs and policies;
- Providing informal counselling and health screening;
- Demonstrate and conduct matters pertaining to personal hygiene;
- Build capacity to address health issues;

- Address social determinants of health;
- Reporting damages to WASH equipment for Maintenance;
- Conducting research and surveillance for improvement;
- Involvement in administrative activities pertaining to WASH;
- Participation in community engagements;
- Bedside nursing
- Physiotherapy
- Changing beddings
- Lifting patients from various positions

Infection control practices by health workers are grouped into standard and transmission -based precautions. Standard based precautions are those that should be applied to all patients at all times while transmission-based precautions are those used on patients known to be infected or colonized with a highly transmissible or epidemiologically important pathogens.

With the advent of Covid 19 generally the following Standard Operating Procedures (SOPs) were developed and others intensified, benefits are evident even in other communicable diseases, therefore the practices are encouraged to continue.

- Keeping a distance between persons of not less than 2Meters
- Wearing of a facial mask completely covering the nose and mouth
- Regular washing of hands for not less than 20sec or use of alcohol-based sanitizers
- Not touching delicate body parts (Mouth, Nose, Eyes)
- Health care workers are to wear long sleeved gowns or aprons depending on activity or level of cadre.
- Robust hand hygiene to be emphasized at all level of service
- All HCWs to use PPEs to mitigate contamination from non-intact skin and body secretions or fluids
- All persons to cover nose and mouth while coughing or sneezing
- All persons everywhere to perform hand hygiene after contact with respiratory secretions
- No spitting in open places
- HCWs to limit patient movements within the institutions etc.

For more details on COVID 19 SOPs please refer to The National Guidelines for COVID 19, MOH Uganda, April 2020.

VERY IMPORTANT:

Other practices generally conducted include but not limited to:

- Wash hands after:
  - Having contact with unclean equipment and work surfaces, soiled clothing
  - After having contact with patient care area, and patient, family member;
- Work areas, surfaces and utensils must be cleaned between different patients;
- Do not prepare trays, swabs or medicinal preparations on the ground – use worktops;
- Wearing rings and nail polish during working hours should be discouraged;
- Staff suffering from highly communicable diseases should be immediately given leave or isolated;
- Clean up worktops and reusable equipment properly before, and after use, whenever applicable sterilize;
- Use correct handling and storage techniques for all medicines and equipment
- Do not allow any animals into the healthcare facility;
- Routine fumigation must be carried out for eradication of rodents and insects that would be a source contamination and destruction;
- Use appropriate equipment for storage and carriage of instruments and medicines to control contamination.

CHAPTER 8: **HEALTH CARE WASTE MANAGEMENT**

8.1. Introduction

Health care waste management (HCWM) is an integral part of hygiene within a HCF and proper management is essential to prevention and control of nosocomial (hospital acquired) infections.

Poor management of health-care waste exposes health-care workers, waste handlers and the community to infections, toxic effects and injuries. There is also a potential for spreading drug-resistant microorganisms from health-care facilities into the environment through poor health-care waste management (WHO, 2015a).

Sharps and, more specifically, needles are considered the most hazardous category of health-care waste for health-care workers and the community at large, because of the risk of needle-stick injuries which carry a high potential for infection (WHO, 2006).

The waste management processes include:

- Waste minimization
- Segregation
- Handling
- Collection
- Transportation
- Storage
- Treatment
- Final disposal

8.2. Objective

HCW management is intended for minimizing waste generation, proper collection, storage, transportation, proper treatment of the hazardous wastes and final disposal. All these stages require proper handling of waste to minimize health risks by respective operators and the community.

8.3. Categories of Wastes

About 85% of the waste produced by health-care providers is comparable to domestic waste and usually called "non-hazardous" or "general health-care waste". It comes mostly from the administrative, kitchen and housekeeping functions of health-care facilities and may also include packaging waste and waste generated during construction and maintenance of health-care buildings. The remaining 15% of health-care waste is regarded as "hazardous" and can pose a number of health and environmental risks, WHO 2017. (Figure 8-1)

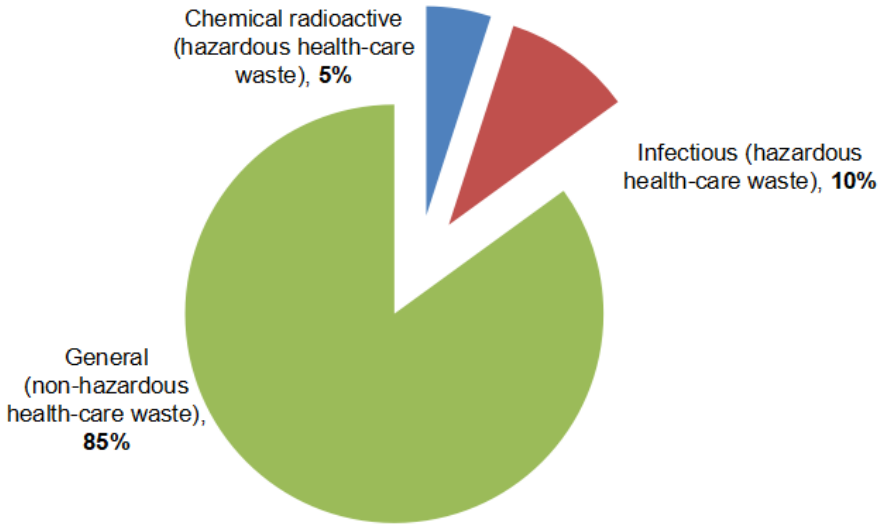

Figure 8.1: Typical waste composition in health-care facilities

Table 8-1 describes the different hazardous and non-hazardous waste categories (with examples) and the associated risks.

Table 8.1: Categories of health-care waste

Waste categories	Descriptions and examples
Hazardous health-care waste	
Infectious waste	Waste known or suspected to contain pathogens and pose a risk of disease transmission, e.g. waste and waste water contaminated with blood and other body fluids, including highly infectious waste such as laboratory cultures and microbiological stocks; and waste including excreta and other materials that have been in contact with patients infected with highly infectious diseases in isolation wards
Sharps waste	Used or unused sharps, e.g. hypodermic, intravenous or other needles; auto-disable syringes; syringes with attached needles; infusion sets; scalpels; pipettes; knives; blades; broken glass

Pathological waste	Human tissues, organs or fluids; body parts; foetuses; unused blood products.
Pharmaceutical waste, cytotoxic waste	Pharmaceuticals that are expired or no longer needed; items contaminated by, or containing, pharmaceuticals. Cytotoxic waste containing substances with genotoxic properties, e.g. waste containing cytostatic drugs (often used in cancer therapy); genotoxic chemicals.
Chemical waste	Waste containing chemical substances, e.g. laboratory reagents; film developer; disinfectants that are expired or no longer needed; solvents; waste with high content of heavy metals, e.g. batteries, broken thermometers and blood pressure gauges.
Radioactive waste	Waste containing radioactive substances, e.g. unused liquids from radiotherapy or laboratory research; contaminated glassware, packages or absorbent paper; urine and excreta from patients treated or tested with unsealed radionuclides; sealed sources.
Non-hazardous or general health-care waste	
	Waste that does not pose any specific biological, chemical, radioactive or physical hazard.

8.4. Sundries for Waste Management

The various categories of waste are to be segregated into lined foot pedalled, colour coded containers of sizes ranging between 15 liters to 360 liters depending on the scope of work at the point of generation, in the colours black, yellow, red and brown (figure 8-4), safety boxes. The color-coded waste segregation systems should be followed and maintained from point of generation to the disposal site.

8.5. Waste Sources and Generation Points in HCFs

Depending on the size, complexity and specialty of a facility, waste is majorly generated in the compound, at all points of care, service centers, sanitary facilities, to mention a few, its therefore necessary for management to plan for the appropriate supplies in sorts and sizes depending on the traffic, or load, nature of waste and quantity or volume.

The organogram in Figure 8-2 shows some of the places were waste is generated.

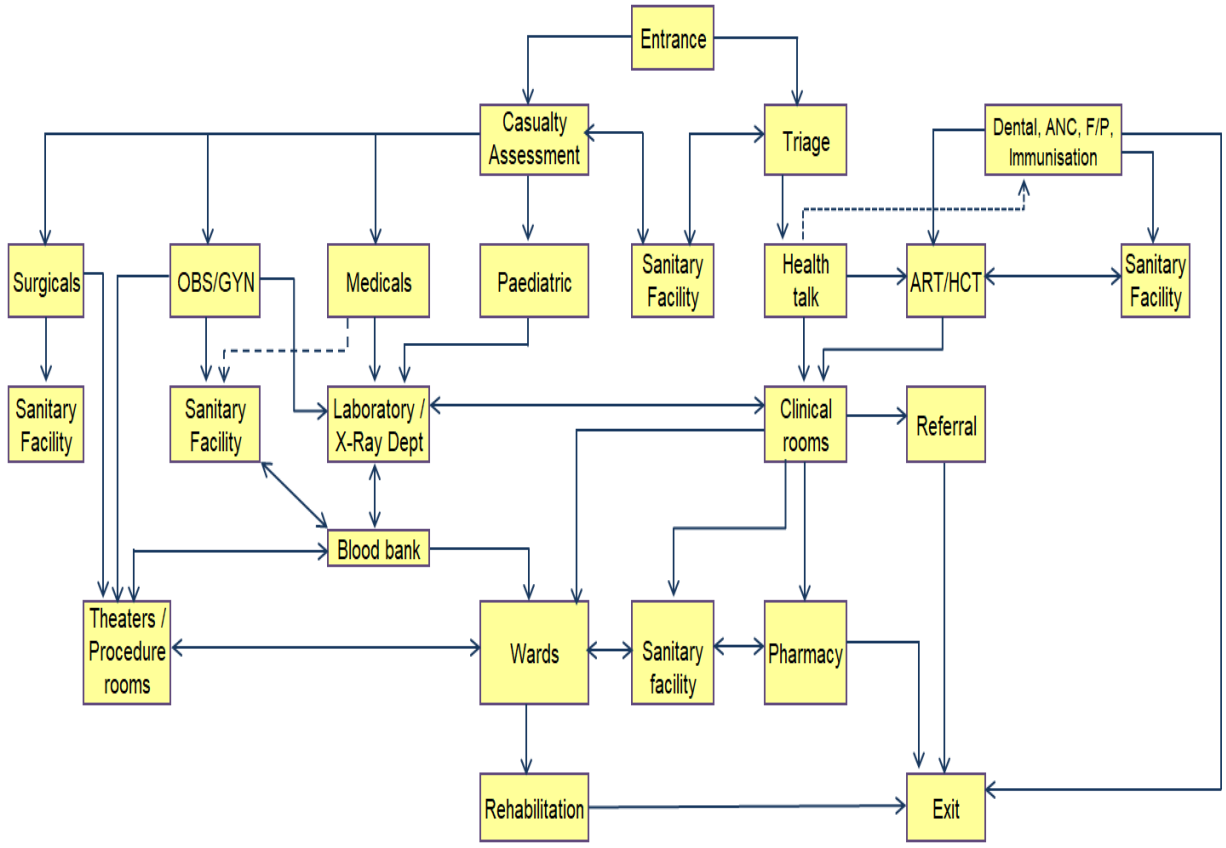

Figure 8.2: Patient flow streams and waste generation organogram in HCF

Healthcare waste is generated from both public and private healthcare facilities. Healthcare waste facilities can be classified as major or minor sources depending on the volume of healthcare waste generated as follows:

Major sources: National / teaching / specialist hospitals, regional referral hospitals, general hospitals, big private hospitals and laboratories, mortuaries and research centres.

Minor sources: Small private laboratories, health centres, clinics, pharmacies, maternity homes, bone setting centres, tattoo centres, acupuncture clinics and other centres.

The amount and composition of healthcare waste generated by healthcare facilities depends on waste management system, type of healthcare establishments, the number of patients treated on a daily basis and the level of complexity specialization of the healthcare facility

8.6. Waste Minimization

Waste minimization is the most preferred approach to reducing negative impacts of health care waste (Figure 8-3). It may be performed at the source i.e. where waste is generated but it should also be implemented at the procurement stage including considering green purchasing and adopting inventory management strategies.

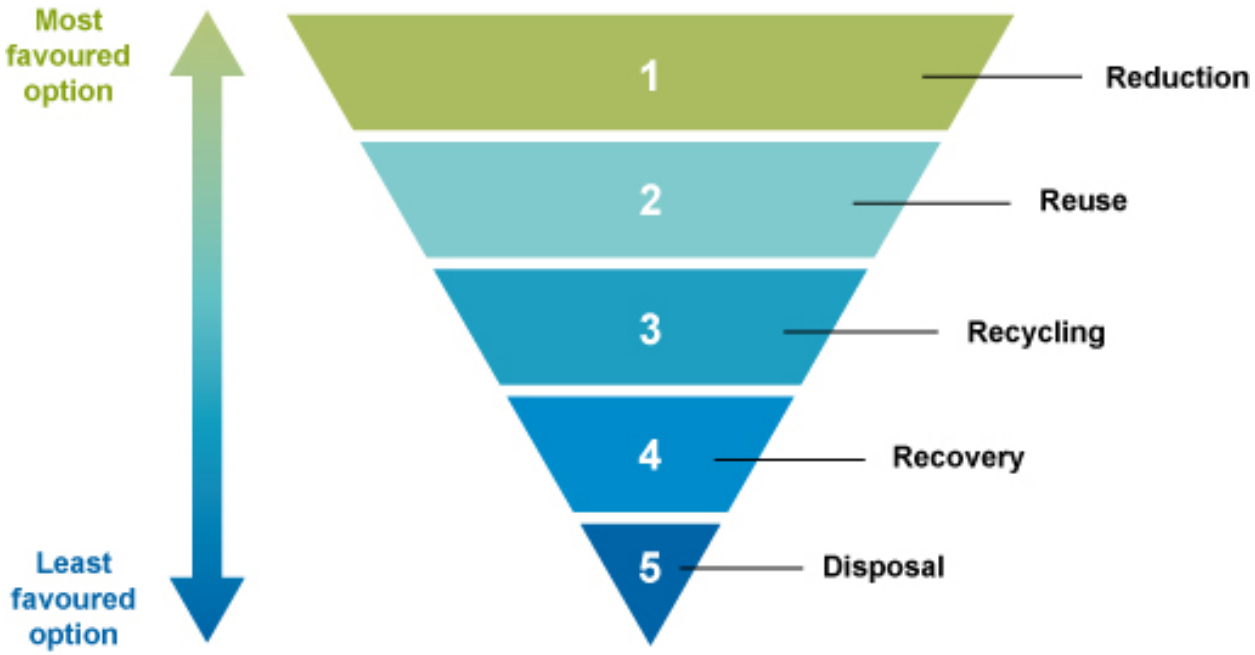

Figure 8.3: Waste Minimization Hierarchy

8.6.1. Estimation of Healthcare Waste Quantities Generated by HCFs

Data on healthcare waste volumes generated by healthcare facilities in Uganda is extremely limited. A national study on HCWM in Uganda (Carl Bro, 2003) estimated the waste generation as follows:

- 0.1kg/bed/day (excl. pathological waste) at hospital level
- 3.0kg/day at HCIV level
- 2.0kg/day at HCIII level
- 0.5kg/day at HCII level

The results are estimations but give an indication of waste production at the different levels.

Estimations carried out during the national assessment can only give an indication of total volumes collected but are not accurate.

8.6.2. Waste Segregation / Sorting

The correct segregation of health-care waste is the responsibility of the healthcare provider and/or patient and caregiver who produces each waste item. The health-care facility management is responsible for making sure there is a suitable segregation, transport and storage system, and that all staff adhere to the correct procedures.

Segregation should be carried out by the producer of the waste as close as possible to its place of generation, which means segregation should take place in a medical area, at a bedside, in an operating theatre or laboratory by nurses, physicians and technicians. If classification of a waste item is uncertain, as a precaution it should be placed into a container used for hazardous health-care waste.[17]

Proper segregation must follow standardized procedures to reduce the risks of infecting health care workers, clients and community. It should also enable use of the most efficient treatment procedures for each waste stream. Segregation must be:

- Simple to be implemented by all health care workers;
- Able to guarantee the absence of infectious HCW in the domestic waste flow;
- Applied in all the HCFs; and
- Regularly monitored to ensure compliance.

The following guidelines apply to HCW Segregation:

i) Segregation of HCW should consist of separating the different waste streams basing on the type of treatment and cost benefits of the method of disposal;

ii) Segregation shall take place at the source or at the site of generation (bedside in the ward, Operation Theatre, Medical Diagnostic Laboratory, or any other room or ward in the health care facility where the waste is generated);

iii) Segregation of HCW practices should provide colour-coded waste bins specifically designated for each category of waste. The colour coding system aims at ensuring an immediate uncountable identification and segregation of the hazards associated with the type of HCW that is handled or treated. In this respect, the colour coding system shall remain simple and be applied uniformly throughout the country. In the absence of color coded bins, however, labeling can be used as an alternative;

iv) Maintain a clean and dry waste storage area and environment at the facility; and

v) Ensure waste is properly stored in a secured area to mitigate exposure to the patients and their carers.[18]

vi) Education and training must be provided to all staff who are responsible for both segregation and collection of waste.

vii) The appropriate waste receptacle (bags, bins, sharps boxes) should be available in each medical and other waste-producing area in a health-care facility. This allows for segregation and disposal of waste at the point of generation, and reduces the need to carry waste through a health service area.

viii) Posters showing the type of waste that should be disposed of in each container should be placed near to the bins (e.g. on the walls as appropriate) to guide staff and reinforce good habits.

17 Safe management of wastes from healthcare activities – WHO Second Edition, 2014
18 Approaches for Health-care Waste Management – MOH, 2009

The nine categories of HCW shall be segregated and colour coded as follows:

Table 8.2: Recommended Segregation Scheme for Health Care Wastes

Segregation category	Colour	Type of Container
Non-hazardous waste	Black	Biohazard bag or bin with liner
Infectious clinical waste	Yellow	Biohazard bag or bin with liner
Sharp waste	Yellow	Safety box
Radioactive waste	Yellow	Secure container with radioactive symbol
Anatomical waste and placenta	Red	Biohazard bag or bin with liner
Highly infectious waste	Red	biohazard bag or bin with liner
Wastes with high contents of heavy metals	Red	Secure container
Effluents	Red	Flask or container
Hazardous pharmaceutical and cytotoxic waste	Brown	Biohazard bag or bin with liner
Adopted from the Approaches to Health Care Waste Management - MOH, 2009		

8.6.3. Recommended Colour Coding

It is recommended that segregation is done following the color-coding system in the Table 8-3 and figure 8-4 to prevent health risks and increase on efficiency.

Table 8.3: Colour Coding System

	Non-hazardous wastes bin **Black** for general wastes like packaging materials, paper, leftover food, plaster of Paris (POP), needle wrappings
	Hazardous wastes bin **Yellow** for infectious wastes sharps such as surgical blades, needles, broken glass and radioactive materials.
	Hazardous waste bin **Red** for highly infectious wastes like pathological, anatomical waste, or effluent and heavy metals
	Hazardous waste bin **Brown** filled pharmaceutical and cytotoxic waste or heavy metals. Include the effluents.

Figure 8.4: Colour coded bins with respective bin liners with posters placed above each bin to guide on the type of waste to be disposed therein

Source: Kagga & Partners

8.7. Health Care Waste Packaging

The following guidelines should be included in packaging. Infectious wastes should be contained from the point of origin to the point of treatment where it is rendered non-infectious. The packaging should be appropriate for the type of waste involved.

- Sharps (sharp items, or items with sharp corners): place sharps in impervious rigid, puncture-resistant containers made of glass, metal, rigid plastic, or cardboard.
- Liquid infectious waste should be placed in capped or tightly stoppered bottles or flasks and large quantities may be placed in containment tanks.
- Solid or semisolid waste should be placed in durable, tear resistant plastic bags. The following recommendations should be observed:
    - Do not load bags beyond their weight or volume capacity;
    - Keep bags away from contact with sharp objects;
    - Consider double bagging to ensure tear-resistance.
- There should be special packaging characteristics for some treatment techniques: incineration requires combustible containers, and steam sterilization requires packaging materials such as low-density plastics that allow steam penetration and evacuation of air.

8.8. Collection within the Healthcare Facility

Collection times should be fixed and appropriate to the quantity of waste produced in each area of the healthcare facility. General waste should **not** be collected at the same time or in the same trolley as infectious or other hazardous wastes.

Waste bags and sharps containers should be filled to no more than three quarters full. Once this level is reached, they should be sealed ready for collection. Plastic bags should never be stapled but may be tied or sealed with a plastic tag or tie. Replacement bags or containers should be available at each waste-collection location so that full ones can immediately be replaced.

Waste bags and containers should be labelled with the date, type of waste and point of generation to allow them to be tracked through to disposal. Where possible, weight should also be routinely recorded. Anomalies between departments with similar medical services or over time at one location can show up differences in recycling opportunities, or problems such as poor segregation and diversion of waste for unauthorized reuse.

Collection should be daily for most wastes, with collection timed to match the pattern of waste generation during the day. For example, in a medical area where the morning routine begins with the changing of dressings, infectious waste could be collected mid-morning to prevent soiled bandages remaining in the medical area for longer than necessary. Visitors arriving later in the day will bring with them an increase in general waste, such as newspapers and food wrappings; therefore, the optimum time for general and recyclable waste collection would be after visitors have departed.

In comparison with this general type of medical area, a theatre would generate a high proportion of potentially infectious waste and could have several collections during the day to fit in with the schedule of operations. A child and maternal health clinic might generate primarily sharps waste from injections, which would be collected at the end of each working day. Table 8-4 presents the summary of the recommended collection scheme for health-care wastes.

Table 8.4: Collection scheme for health-care wastes

Waste categories	Collection Frequency
Infectious waste	When three-quarters filled or at least once a day.
Sharp waste	When filled to the line or three-quarters filled.
Pathological waste	When three-quarters filled or at least once a day.
Chemical and pharmaceutical waste	On demand.
Radioactive waste	On demand.
General health-care waste	When three-quarters filled or at least once a day

8.9. Waste Storage

The following guidelines should be adhered to in waste storage:

i) In each health care unit where HCW is generated, an adequate place shall be dedicated for storing HCW bags, bins or containers.

ii) In all HCFs, separate central storage facilities shall be provided for hazardous HCW, except radioactive waste that shall be stored separately. It shall clearly be mentioned that the facility stores hazardous HCW. Health care facilities below level three should store no materials other than yellow bag waste. Highly infectious waste and anatomical waste (except heavy metals and effluent waste) should be disposed of immediately. No waste shall be stored for more than two days before being treated or disposed of. Properly treated waste can be stored up to maximum of one week. Additional guidelines for highly infectious waste should be adhered to like in the case of outbreaks.

iii) The designated central storage facility shall be located within the HCF premises close to the treatment unit but away from food storage or food preparation areas.

iv) The designated central storage facility should be large enough to contain all the hazardous HCW produced by the hospital during one week, with spare capacity to cope with any maintenance or breakdown of the treatment unit.

v) The designated central storage facility shall be totally enclosed and secured from unauthorized access.

vi) The designated central storage facility shall be inaccessible to animals, insects and birds.

vii) The designated central storage facility shall be easy to clean and disinfect and shall have an impermeable hard-standing base, good water supply, drainage and ventilation.

Please Note:

- *All highly infectious waste (red bags) from isolation wards should be disposed of immediately.*
- *Infectious waste should be stored for a minimum of 2 days if not treated and 1 week if treated.*
- *The waste should be packaged securely enough to ensure containment of the waste and to prevent penetration by rodents and vermin.*

- *Limited access to the storage area is recommended.*
- *The universal biological hazard symbol should be posted on the storage area door, and waste containers. Containers for bio-hazardous material should be a distinctive red colour.*

8.10. Waste Handling

The following guidelines should be followed in waste handling:

i) All HCW or disposal of medical equipment shall be disposed of at the point of use by the person who used the item. In case the used equipment is found when not disposed of or handed over to another person for disposal the one who finds it or given the responsibility of disposing it of should do it.

ii) All the specific procedures of HCW segregation, packaging and labeling shall be explained to all health care workers and displayed in each department in chart form and pestered on the walls above the HCW segregation containers to remind the health worker of what to do.

iii) Waste handlers shall wear protective clothing including face masks, aprons and boots, heavy duty gloves, goggles as required when handling waste.

iv) Carts and recyclable containers that are used repeatedly for transport should be disinfected after each use. Single-use containers should be destroyed as part of the treatment process.

8.11. Transportation of Waste

8.11.1. Transport to Central Storage

The following guidelines should be followed during transportation of HCW to the central storage area:

i) The waste collection trolley should be easy to load and unload. The trolley shall not be used for any other purpose. It shall be cleaned regularly and before any maintenance work is performed on it.

ii) Yellow bags of hazardous HCW and black bags of non-hazardous HCW shall be collected on separate trolleys that shall be painted and marked with the corresponding colour codes. The trolleys shall be washed regularly using a disinfectant and soft brush.

iii) The collection route shall be the most direct one from the collection point to the central storage.

iv) The collected waste shall not be left temporarily anywhere along the way to the storage area other than at the designated central storage.

v) Containers should be covered with lids during storage and transport. Carts should be used for transporting bags of infectious waste within the facility.

8.11.2. Transport to Final Disposal Site

When the waste is to be moved to final disposal site, special handling or packaging is necessary to keep bags intact and to ensure containment of the waste. The following procedures should be followed:

i) Single-bagged waste and containers of sharps and liquids should be placed within a rigid or semi-rigid container such as a bucket, box, or carton lined with plastic bags.

ii) Containers should be covered with lids during transportation.

iii) When transporting plastic bags of infectious waste, care should be taken to prevent tearing the bags.

iv) Infectious waste should not be compacted before treatment. This process could damage the packaging and disperse the contents, or it could interfere with the effectiveness of treatment.

v) Infectious waste should be transported in closed, leak-proof dumpsters or trucks when transported offsite.

vi) The waste should be placed in rigid or semi-rigid, leak-proof containers before being loaded onto trucks.

vii) In case off-site transportation is required to treat hazardous HCW at treatment facilities, NEMA through the local Government shall approve the off-site transportation plan before any transportation occurs.

viii) All yellow and red bags shall be collected and transported at least every second day.

ix) The transportation shall be properly documented, and all vehicles shall carry a consignment note from the point of collection to the treatment facility.

x) Vehicles used for the carriage of yellow or red bags shall be disinfected prior to use for any further use.

xi) The vehicles shall be free of sharp edges, easy, to load and unload by hand, easy to disinfect /clean, and fully enclosed to prevent any spillage in the HCF premises or on the road during transportation.

xii) All vehicles shall be cleaned and disinfected after use.

xiii) The vehicles shall carry adequate supply of plastic bags, protective clothing, cleaning tools and disinfectants to clean and disinfect in case of any spillage.

xiv) All staffs handling yellow or red bags shall wear protective clothing.

xv) Staffs shall be properly trained in the handling, loading and unloading, transportation and disposal of the yellow and red bags. Staffs shall be fully aware of emergency procedures for dealing with accidents and spillage.

8.12. Methods of Waste Treatment and Disposal

The choice of waste treatment or disposal technology shall be selected from the available current technologies that should have the following characteristics:

i) Most reliable, affordable and sustainable technology in accordance with the technical, human and financial resources of each HCF; and

ii) Minimizes the immediate public health risks associated with HCWM with the lowest impact on the environment.

The factors to consider include:

- Waste characteristics
- Quantity of wastes for treatment and disposal
- Capability of the health-care facility to handle the quantity of waste
- Types of waste for treatment and disposal
- Technology capabilities and requirements
- Local availability of treatment options and technologies
- Capacity of the system
- Treatment efficiency
- Volume and mass reduction
- Installation requirements
- Available space for equipment
- Infrastructure requirements
- Operation and maintenance requirements
- Skills needed for operating the technology
- Environmental and safety factors
- Environmental releases 8 106Safe management of wastes from health-care activities
- Location and surroundings of the treatment site and disposal facility
- Occupational health and safety considerations
- Public acceptability
- Options available for final disposal
- Regulatory requirements
- Cost considerations i.e. equipment purchase costs and shipping

Several methods are available for appropriate treatment of infectious waste, depending on the type of waste material. These treatment methods shall include one of the following or combination of options:

- Steam sterilization,
- Incineration,

- Thermal inactivation,
- Gas/vapor sterilization,
- Chemical disinfection, and
- Sterilization by irradiation, or electromagnetic radiation.

Acceptable treatment methods for the various types of wastes are listed in Table 8-5 and Table 8-6.

Table 8.5: Recommended techniques for treatment of infectious wastes

Types of infectious waste	Recommended treatment techniques				
	Steam sterilization	Incineration	Burning and low-temp incineration	Chemical disinfection	Thermal inactivation
Cultures and stocks of infectious agents and associated biologicals	X	X	X	X	
Human blood and its products	X	X		X	
Pathological Waste	X	X			
Contaminated Sharps	X	X	X		
Carcasses and parts	X	X			
Bedding		X	X		
Isolation wastes	X	X			
Adopted from the Approaches to Health Care Waste Management - MOH, 2009					

Table 8.6: Methods of HCW treatment and disposal

Methods	Description	Type of waste handled	Location of treatment
Autoclave	Steam treatment of waste at high temperature and pressure for sufficient amount of time for sterilization	cultures and stocks, sharps, materials contaminated with blood and limited amounts of fluids, isolation and surgery waste, laboratory waste (excluding chemical waste) and "soft" waste (including gauze, bandages, drapes, gowns and bedding) from patient care	Onsite
Chemical Disinfection /High-level Disinfection (HLD)	Chemical disinfection is the preferred treatment for liquid infectious wastes, but it can also be used in treating solid infectious waste.	Infectious liquid or solid wastes	Onsite
Medical waste shredder	A cabinet-type small medical waste shredder equipped with cutting blades reduces the size and volume of medical waste up to 50 percent, while the industrial type for high volume waste has either a small vertical steam sterilizer or a big autoclave incorporated to provide sterilization together with the shredder.	Crashes medicine and saline bottles, blister packs, syringes, blood bags, ampules etc.	Onsite
Disinfection and Autoclave for reuse	Soak stainless steel instruments in an aqueous solution of a required percentage of hydrogen hypo-chloride. Using appropriate cleaning material, remove all organic matter once instruments are disinfected and cleaned through a four-bucket system, autoclave for sterilization and subsequent reuse	Stainless steel instruments	Onsite

Methods	Description	Type of waste handled	Location of treatment
Encapsulation	Containers are filled with three quarters full with hazardous waste, materials such as cement mortar, bituminous sand or plastic foam is used to fill the container. When cupping material is dry, the container is buried or land filled or stored.	Pharmaceutical residues, chemical or heavy metal wastes, incineration ashes with high metal content and sharps	Offsite
Dry heat technology	Heat created through conduction, convection or thermal radiation is applied to the waste without applying steam. The advantage here is, treated waste is dry and generally unrecognizable and is generally easier to install and operate	sharps and pathological wastes	Onsite
Double chamber (pyrolytic/ starved air) incineration	A furnace of Masonry or concrete, refractory material and metals waste thermally decomposes in the first chamber, an oxygen-poor (pyrolytic chamber) which operates at 800-900°C. In the second chamber, the gases produced in the first chamber are burnt at high temperature (1100-1600°C). if the temperature drops below 1100°C (which is the minimum requirement specified in the European Union's waste incineration Directive 2000/76/EC, additional energy should be provided by a gas or fuel burner) The advantage here is it disinfects very effectively, reduces waste volume by approximately 95 percent and has fewer toxic emissions and odours. P.S it shouldn't be used for PVC incineration	Refractory material and metals	Onsite

Methods	Description	Type of waste handled	Location of treatment
Single chamber incinerator	It's a simple furnace of solid construction i.e concrete or brick. Waste is placed on a fixed grate and burning is maintained by natural flow of air operating at a temperature of less than 300°C. may need to add kerosene or similar fuel to maintain combustion. The advantage here is that burning efficiency is of 90-95 percent and reduces waste volume by approximately 80% and disinfects effectively. Without proper operation and maintenance practices, air pollution can occur, including emission of some toxins.		Onsite
Return to supplier	Unused or expired products are returned to the product supplier or manufacturer for proper disposal or reuse. It has no significant environmental impact and it's a good method to use for expired or used pharmaceutical, medical or other supplies.	Expired pharmaceutical or medical supplies	Offsite
Composite or biological process	Micro-organisms are added to the waste to it breakdown. It is primarily used for domestic and yard waste and it has no significant environmental impact	Domestic garbage and food wastes	Onsite or Offsite
Safe burying	Burial of waste in a pit. Access to the pit should be limited and the pit should be at least lined with clay to prevent ground water pollution and 1.5m above the ground water table	Domestic garbage and food wastes	Onsite or Offsite
Municipal land fill	Municipal solid waste landfills are able to receive household and industrial solid waste, non-hazardous waste, construction and demolition debris.	Non-hazardous wastes	Offsite

8.13. Placenta Pit

Placenta pits allow pathological waste to degrade naturally. Around 90% of the waste is liquid, which will soak away into the ground. The rest will degrade through a complex and variable mixture of biological and chemical processes. These are primarily anaerobic processes though some aerobic decomposition will take place in the upper layers. The waste should not be treated with chemical disinfectants like chlorine before being disposed of because these chemicals destroy the microorganisms that are important for biological decomposition.

As the waste decomposes, pathogens will be destroyed as well, though some, including eggs, are more resilient than others. At present there are little data on how long it will take for all pathogens and eggs to die, so it is recommended that 2 years be allowed to pass before reopening.

At least the top 50 cm of the pit should be reinforced with concrete to prevent surface water infiltration, and its base should be made of concrete to stabilize the structure and to slow the downward movement of liquid towards the water table.

The pit shown in the figure below (Figure8-5) can be also constructed from a standard concrete ring with a diameter of about 1 m. The top slab should be above ground level and made of water-tight concrete to prevent surface water infiltration. The top should be closed by a lockable hatch and a vent pipe installed to ensure that the generated gases can escape and air can get in. Where soil is particularly sandy, extra precautions may need to be taken to protect the water table and to prevent the pit from collapsing: the sides may be reinforced with bricks, laid with gaps between them so that the liquids can still escape.

The pit should be closed off with a concrete slab to reduce the risks of attracting vectors such as flies, mosquitoes and rodents. It is essential that the organic waste be covered with the lid immediately after disposal to avoid attracting insects and rodents. In the very early stages of an emergency, the slab can still be made of wood, but it has to be replaced rapidly by a concrete model.[19]

8.13.1. Placenta Pit Pre-construction Planning

(i) Decide on the purpose of the pits

- Pits can be used for pathological waste and organic waste such as food;
- Non-infectious waste can be composted separately if facilities exist;
- Reserving the pits for pathological waste alone will extend their useful life.

(ii) Decide on the number and capacity of pits required

- Two pits are recommended. This means that the second one is available immediately when the first is filled and avoids the facility being left without any disposal option.

19 Doc 575: Technical Specifications: Placenta Pit – Médecins Sans Frontières, Health Care Waste Management, Reviewed May 2001

- Calculate the volume required based on the amount of pathological waste/organic waste being generated. The weight of the average placenta as a rule of thumb, weighs 600g, or one-sixth of the weight of the baby. A conservative estimate for calculating the volume required is that each placenta and associated liquid will have one liter of volume, but that 90% is liquid that will eventually soak away.
    - For a circular pit of 1 m diameter, each usable meter of depth has the capacity for 500 placentas. Hence a pit of 3.5 meters depth will have 3 m of usable depth and 0.5 m of free space. This will be able to take 1,500 placentas (4 placentas per day for a year) even if there is no loss of liquid. Assuming 90% loss, this can be sustained for several years. Even if there is only slow loss of liquid (4 months for 90% to leach into soil), a pit of this size will take 10 placentas per day for over 6 years before it fills up.
    - See also Table 8-7 below for the numbers of placentas that can be put into pits of different volumes.
    - As a rule of thumb, two pits, each with the capacity for 1 year without loss of liquid are needed, or one pit with the capacity for 2 years. This will ensure that even if the pit does not leach as quickly as expected, there will be enough capacity to allow the facility time to make contingency plans.
- Include an extra 0.50 m at the top of the pit as free space that will not be filled.
- Having two pits may also allow for pits to be reused once enough time has elapsed for degradation to reduce the volume of waste. The rate of decomposition depends on several factors including humidity, temperature and any chemicals added to the pit. A minimum time of 1 year is recommended before reusing a pit. Material should not be removed from a pit unless at least two years have elapsed to allow all pathogens and eggs to die.
- Any material removed from placenta pits should be handled with PPE unless it has been tested and found to be free of pathogens.

(iii) Select location of pits

- As far away as possible from publicly accessible areas and from hygienically critical areas (e.g., water wells, kitchen, etc.).
- Far enough from other buildings and public areas to avoid problems from odors.
- A secure location that non-authorized people and animals (e.g., feral dogs) cannot get into. This may be part of a waste disposal zone or a dedicated area.

(iv) Consider the local soil type

- If the soil is particularly sandy it may require extra reinforcement to prevent the pit from collapsing.
- If the subsoil is very rocky and/or has a lot of cracks, the pit may be partially dug in a very well-compacted earth mound. In this case the above ground part should be completely lined with bricks or stones and should be watertight.

(v) Check the pit will not affect the groundwater.

- Placenta pits are not recommended in sites where the water table is near the surface or in areas prone to flooding.
- At least 1.5m from the bottom of the pit to the groundwater level is recommended.
- Dig a test pit and insert a narrow metal pipe or bar into the soil to a depth of 1.5 m. If the end of the bar is wet or soil removed from the pipe is wet, the pit may be too close to the ground water. Note that recent heavy rain may affect the results.
- If the groundwater is too close to the bottom of the test pit, consider other options:
    - Changing the design of the pit to make it wider but shallower;
    - Creating more, shallower pits;
    - Creating a pit that is partially in a mound of very well-compacted soil. In this case the above-ground part should be completely lined with bricks or stones and should be watertight.

Table 8.7: Number of placentas per day that can be put in pits of different volumes

Diameter (m)	Radius (m)	Area (m^2)	Total depth (m)	Usable depth (m)	Volume (m^3)	No. of placenta per year	Deliveries per day
1	0.5	0.8	1.5	1	0.8	786	2
1	0.5	0.8	2.5	2	1.6	1571	4
1	0.5	0.8	3.5	3	2.4	2357	6
1	0.5	0.8	4.5	4	3.1	3142	9
1	0.5	0.8	5.5	5	3.9	3928	11

This table is based on a one-meter diameter pit and ignores the leaching of liquid. As a rule of thumb, two pits each with capacity for one year should be adequate for any facility. Adapted from Doc 575: Technical Specifications: Placenta Pit – Médecins Sans Frontières,

8.13.2. Placenta pit use

- Only use the pit to dispose of pathological and biodegradable organic waste.
- Do not use the pit for soft waste (e.g. bandages), sharps or toxic waste.
- Do not treat the waste with chemical disinfectants such as chlorine before disposal. These chemicals destroy the microorganisms that are important for biological decomposition
- Dispose of organics in the pit as soon as they arrive.
- Keep the cover over the hole at all times except when putting waste into the pit.
- Clean and disinfect the slab regularly. Non-persistent disinfectants such as hydrogen peroxide are recommended.
- Do not add disinfectants to the pit.

- Ash, charcoal or lime may also be added to reduce odors.
- Ash or charcoal helps reduce odors without adversely affecting decomposition.
- Lime has a high pH (about 11) so will kill a lot of pathogens, but beware that it may also kill bacteria needed for rapid and complete decomposition.
- When the level of the waste reaches 0.5 m from the surface, the pit should be closed down.
    - Mark it permanently to explain the contents and the closure date.
    - Record the location for future reference.
- It should be possible to reuse the pit after enough time has elapsed.
    - The rate of decomposition depends on several factors, including the microbial and chemical conditions, temperature and humidity.
- If it is necessary to remove material from an old pit:
    - Leave at least 2 years after the closure of the pit to maximise the elimination of pathogens and their eggs or cysts;
    - If possible, test the material to be sure it is not infectious;
    - Provide workers with PPE (mask, goggles, boots, gloves, overalls);
    - Limit the use of any extracted material as a fertilizer; do not use for food growing or outside the hospital premises.

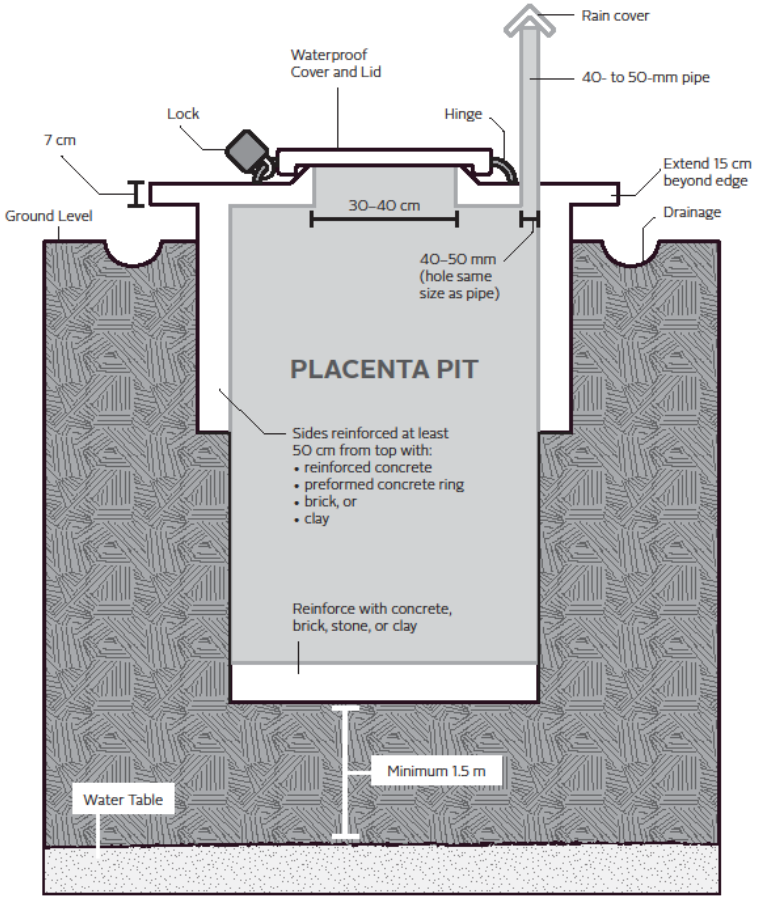

Figure 8.5: Placenta Pit

(Source: Médecins Sans Frontières)

Detailed design of the placenta pit is included in Annex 1.

8.14. Incineration

Incineration is a high-temperature, dry oxidation process that reduces organic and combustible waste to inorganic, incombustible matter and results in a significant reduction of waste volume and weight. High-heat thermal processes take place at temperatures from about 200°C to more than 1000°C. They involve the chemical and physical breakdown of organic material through the processes of combustion, pyrolysis or gasification. A disadvantage of these technologies is the release of combustion by-products into the atmosphere and the generation of residual ash. The combustion of health-care waste produces mainly gaseous emissions, including steam, carbon dioxide, nitrogen oxides, a range of volatile substances (e.g. metals, halogenic acids, products of incomplete combustion) and particulate matter, plus solid residues in the form of ashes.

Gases are ventilated through the incinerator stacks, and the residue or ash is disposed of in a sanitary landfill. If incinerators are properly designed, maintained, and operated, they are effective in killing organisms present in infectious waste.

KEY STEPS TO SELECTING AN INCINERATOR DESIGN:

- *Determine your health system needs for HCWM treatment and disposal solutions.*
- *Assess the infrastructure of the area.*
- *Determine availability of local resources to support construction and operation.*
- *Develop cost estimates.*
- *Assess policy environment.*
- *Identify lead candidate incinerator designs and determine which units to procure.*

8.14.1. Guidelines for Incineration

The following guidelines should be included in Incineration:

- Incineration should be used for aesthetic disposal of pathological wastes such as tissues and body parts.
- Incineration should be used to render contaminated sharps unusable.

- The principal factors affecting incineration like variations in waste composition, the waste feed rate, and the combustion temperature should be considered to maintain efficiency of incinerating infectious wastes. Proper operating procedures must be followed.
- Infectious wastes containing drugs should be disposed of in an incinerator that provides high temperatures and enough time for the complete destruction of these compounds.
- The incinerator's effectiveness in disposing/destroying chemical wastes should be documented/ assessed before use, if applicable.
- Persons involved in Incineration must wear protective clothing and should be trained in handling techniques to minimize personal exposure to hazards from infectious wastes. Some of these techniques include:
    - Use of protective equipment (i.e. Helmet, safety goggles, respiratory mask, heavy-duty heat resistant gloves, apron, clothes that cover the body, heavy-duty heat resistant boots);
    - Prevention of waste spillage during incinerators loading;
    - Management of spills.
- A clearly described method of operation to achieve the desired combustion conditions and emissions; for example, appropriate start-up and cool-down procedures, achievement and maintenance of a minimum temperature before waste is burned, use of appropriate loading/charging rates (both fuel and waste) to maintain appropriate temperatures, proper disposal of ash and equipment to safeguard workers;
- Prohibited materials. The following materials shall not be burned or incinerated due to the toxic emissions they produce:
    - Poly Vinyl Chlorinated (PVC) plastics
    - Photographic and x-ray materials
    - Mercury thermometers
    - Batteries and other Items containing heavy metals
    - Aerosol cans or sealed vials.
- Community safety. All incinerators or burning areas must be:
    - Fenced to prevent access by the community or animals.
    - They should be located away from houses and crops.
- Maintenance and repair. All incinerators should be inspected and maintained by a qualified person on a regular basis.
- Scheduled maintenance - All incineration equipment requires regular service and preventative maintenance. Unscheduled maintenance is also required in the event of failures. A service schedule should be established, and well-trained and qualified

technicians should regularly visit incineration sites to inspect and service the equipment.

- A budget to cover travel of service and maintenance personnel or contractors is essential. During site visits, task performed and consumables or spare parts used should be recorded. Consumables should also be stocked as part of a routine service program.
- Operator logs - It is very important that operator logs are maintained and kept up to date. Information recorded in operator logs should include waste deposited and source, waste destroyed, fuel consumed, equipment defects, and service and maintenance history.
- Enhanced training and management, possibly promoted by certification and inspection programmes for operators, the availability of an operating and maintenance manual, visible management oversight, and regular maintenance schedules;
- Construction using detailed engineering plans and materials to minimize flaws that may lead to incomplete destruction of waste and premature failures of the incinerator.

8.14.2. Guidelines on Installation

Installation of incinerators should include site preparation, equipment installation and commissioning, service and operating instructions provided by the manufacturer, assured manufacturer support, metal works (fuel tank, filter and supply lines, electrical power supply, etc.), and civil works (foundations, pits, water supply and run off for rinsing reusable recipients). Security and the safety of the installation need to be given great importance.[20]

8.14.2.1. Site selection

Certain measures need to be taken to protect the local communities from the possible hazards of medical waste. Incinerators should never be installed in areas where crops are grown; particles from the smoke emitted by the incinerators can settle on crops, making them highly toxic. If for whatever reason incinerators have been installed near cultivated land, the incinerator should be operated only when the wind is blowing away from the crops.

The selection of an appropriate location to install an incinerator is of paramount importance. Key factors to be taken into consideration are:

- The location should be at least 30 meters away from the closest occupied or inhabited building.
- The prevailing winds at the location should blow in a direction away from occupied buildings.
- There should be no regular public passage within immediate proximity of the incinerator.

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- There should be no horticulture or leaf crops within 300 meters of the incinerator in the direction of the prevailing winds.
- The bottom of the ash pit should be above the maximum level of the water table.
- The location should be secure and free from risk of vandalism or theft.
- The location should permit construction of a facility to house the incinerator (unless designed for external use) and store the waste awaiting disposal.
- The site should also include an ash pit and placenta pit (as appropriate).

Incineration by itself is not a solution for medical waste disposal. A complete, self-contained waste management system needs to be put in place. This includes an incinerator; a secure waste storage facility; a fuel store; an area for glass and sharps deposit; a protected ash disposal pit; a lockable secure enclosure for the incinerator; a facility to store the tools, protective clothing, and operator records; and a washing area with waste water runoff. (See Figure 8-6)

Figure 8.6: Waste disposal area enclosed in a chain link fence with gate

(Source: Kagga & Partners)

8.14.2.2. Protective enclosure

Incinerators should be installed in a protective enclosure or suitably ventilated building to prevent access by unauthorized persons and to protect the incineration equipment. A protective enclosure or building should ensure that:

- The incinerator and other materials stored inside are protected from rain and UV radiation from direct sunlight.
- The incinerator is well ventilated and the stack emissions are clear of the building or enclosure so that the operator is not exposed to fumes when the incinerator is in use.

- The enclosure is robust and corrosion resistant, and its design-life is at least equivalent to the expected life of the incinerator.
- The enclosure or building can be securely locked against unauthorized entry.
- There is space within the enclosure to store the operator's protective clothing, tools, and equipment required to operate the system.
- There should also be sufficient space to conveniently store waste to be destroyed, as well as load and operate the incinerator.
- There is provision for an emergency exit should there be a fire or other emergency at the facility.
- There is storage space for solid fuels or a storage reservoir for fuel. This is best located within the incinerator enclosure to ensure adequate security.
- The enclosure has a provision for waste to be deposited without allowing the waste handler, to enter the enclosure or building.

8.14.2.3. Ash pit

All HCWM sites using incineration should be equipped with an ash pit that has sufficient capacity to store ash for a period of at least 5 years. Essential features of a pit are:

- The pit is positioned above any shallow aquifer.
- The pit is positioned to prevent risk of flooding.
- The pit is constructed of concrete, concrete blocks, or brick, with a water-resistant floor to ensure the pit will not collapse.
- The pit has provision to deposit ash or other authorized wastes (i.e., needle containers), without a risk to the waste handler.
- There is provisional access to the pit for purposes of leveling or removal of accumulated waste and subsequent transfer to a municipal landfill.
- The pit is protected from access by unauthorized persons.
- The pit is in the immediate proximity of the incinerator to ensure convenient transfer of ash. (See Figure 8-7)

8.14.2.4. Fuel storage

All incinerators require fuel either to preheat (in the case of auto-combustion incinerators) or to assist throughout the incineration process (in the case of fuel-assisted incinerators). Safe and secure storage of incinerator fuel is imperative. There should be adequate space to safely store dry solid fuel (wood, coconut husks, charcoal, etc.) sufficient for at least one week of operation of the incinerator at auto-combustion sites. A storage reservoir, fuel filter, and shutoff tap or valve should be positioned within the enclosure or building to ensure the fuel supply is not exposed to excessive heat from the incinerator. It should be mounted at an appropriate level to ensure

a gravity supply of fuel and deter access by unauthorized persons. Any storage reservoir should be large enough to store fuel for 3 times the period between normal waste deliveries.

8.14.2.5. Water supply

All HCWM disposal facilities should be equipped with a water supply (spigot) mounted above a concrete pad with either a gutter for runoff and percolation into the ground or connection to a drainage channel. All recipients (e.g., plastic containers, bins, etc.) should be thoroughly rinsed before being returned for reuse.

8.14.2.6. Glass disposal

Glass vials deposited in incinerators tend to clog grates and causes explosions when unopened. As a general rule, glass should not be incinerated. A glass crusher with provision for crushed glass to be heated and sterilized will be essential at disposal facilities. Provision of space within the enclosure or building for equipment to crush glass syringes and vials is important.

Figure 8.7: Picture of an incinerator and ash pit close-by

(Source: Water for People)

8.14.3. Operation Guidelines

Proper operation of an incinerator ensures safe and optimal performance. When operated correctly there will be minimal emissions and waste will be treated more effectively. As previously noted, training is critical to proper operation. The following are key steps that incinerator operators should follow:

i. Wear personal protective equipment - helmet, goggles, respirator, overcoat/overalls, heavy-duty gloves, apron, and boots.
ii. Ensure fuel is available for operating the incinerator and that the waste to be incinerated is dry.
iii. Record the number of safety boxes and bags to be burned.
iv. Clean the incinerator. ƒ

- Remove the ash and deposit it safely in the ash pit.
- Place the grate/tray back in the incinerator.

v. Preheat the incinerator.

- Place firewood or other material in the incinerator.
- Light the wood or other material.
- After 5 minutes of a steady burn, add more wood.
- Continue this process every 5 minutes for 20 minutes total (4 cycles).

vi. Load and burn the waste.

- Load 1 safety box every 8–10 minutes.
- Alternate loading bags of waste with loading safety boxes.
- If the temperature drops, load combustible material such as paper.
- If you see smoke the temperature is too low
- If the temperature gets too high, add a bag of waste.
- If you see fire in the chimney the temperature is too high.

PLEASE NOTE:

- *Keeping the primary chamber as full as possible.*
- *Very wet loads should be separated with drier material, and in extreme cases supplemented by an extra increment of diesel/kerosene.*

- *If the incinerator is being loaded with entirely plastic materials, such as syringes in sharps boxes, it is advisable to let one box burn almost completely before adding the next. The time can be gauged by noting when the smoke level decreases.*
- *If the flame appears to be burning less fiercely, poke out any blockage in the transfer flue between the two chambers. This can be done using a length of steel pushed in through the air holes at the front.*
- *When the loading door is opened, combustible gases may come into contact with air and burn suddenly and fiercely. This is harmless providing the operator is wearing a face mask/eye protection and is not peering directly into the chamber.*
- *When the loading door is closed suddenly more burning gases may come through the air holes; thus the operator should load from the side.*

vii. Burn down the waste.

- Load the last safety box.
- Wait 10 minutes and add firewood to maintain the fire and ensure the waste is completely burned. This may take up to 30 minutes.
- When the waste is completely burned, allow the fire to die out.
- Do not leave the incinerator until the fire has burned down to embers.

Detailed designs of the incinerators are included in Annex 1.

8.15. Mapping the Flow of Waste within HCF

The waste flow illustrated in figure 8-8 shall be followed by the respective health care workers and waste managers at the respective points of care and service delivery, sanitary and outreach centers.

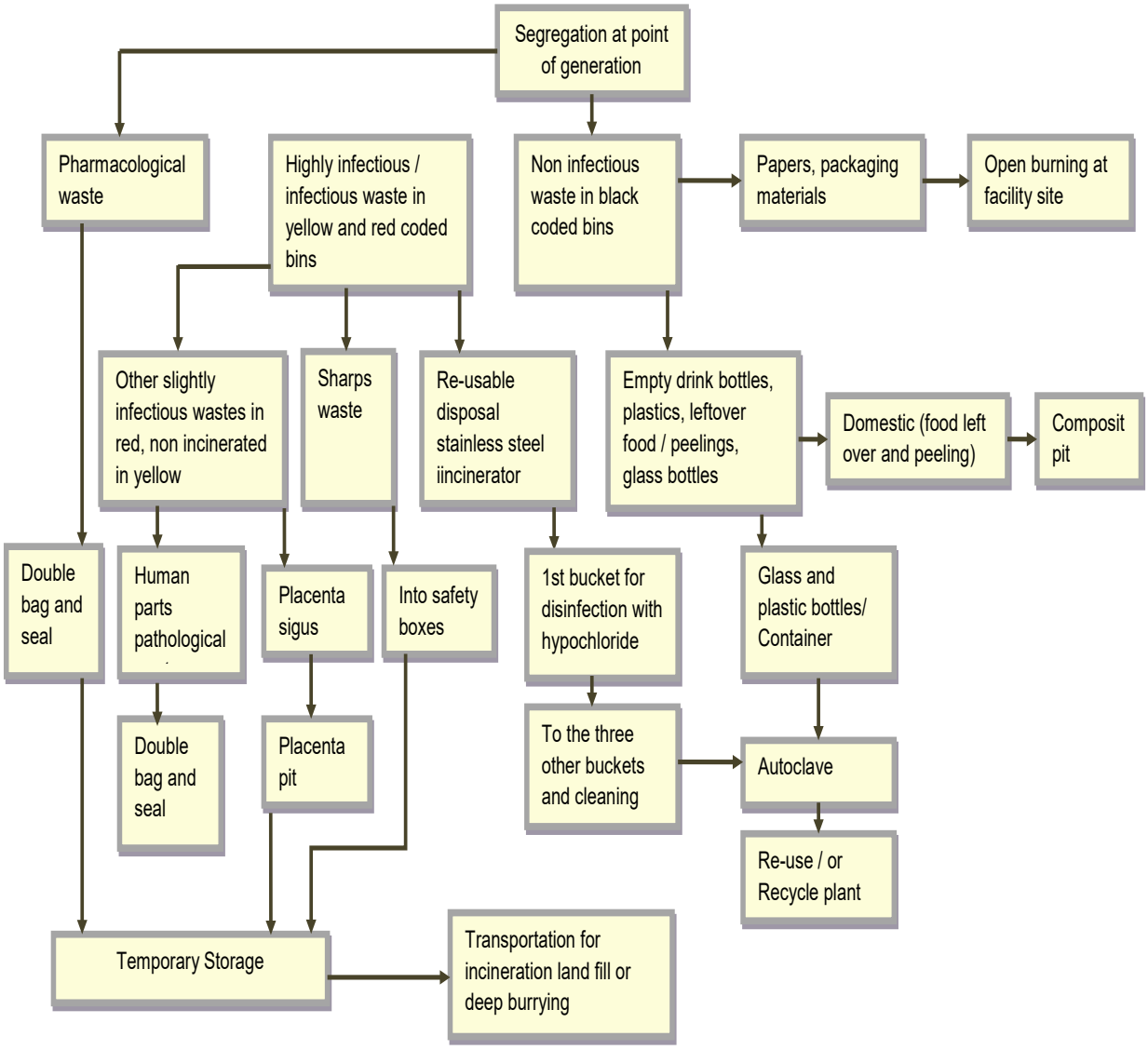

Figure 8.8: Waste Flow Organogram at a healthcare facility

8.16. Guidelines for Facility Waste Management Planning

Each HCW generating facility should have a comprehensive waste Management plan as part of an overall health care strategic plan. The waste management plan should be derived from the national plan. The following guidelines should be included in each facility's plan:

i) Implementation of HCWM plan shall be coordinated by the infection control team/ officer, in collaboration with other stakeholders who are involved in implementation and supervision of Health Care Waste Management practices.

ii) At each facility there should be a designated individual for Health Care Waste Management and this officer should be incorporated into existing Infection Control Committee where applicable. In absence of such committees, a waste management committee responsible for the HCWM plan implementation should be established.

iii) Each facility shall base its planning on a manual describing all the procedures for the management of HCW in the premises including segregation, handling, transport, treatment and disposal. The HCWM plan shall:

- Spell out duties and responsibilities for each management level and different categories of HCF staff members.
- Contain an estimation of the quantities of HCW generated and the annual budgets for the implementation of the HCWM procedures/plan.
- Contain monitoring procedure to track day-to-day activities of the HCF and ensure that HCWM rules are adhered to.
- Contain information on procedures, display and location of HCF staffs, receptacles, storage at strategic points.
- Contain budgets for training of all categories of HCF staff members, including newly recruited workers.
- Contain budgets for emergency storage and disposal of hazardous HCW in the events of a breakdown of the incinerators or autoclave, and in cases of emergencies as in epidemic out breaks/epidemics.

8.17. Healthcare Wastewater Management

8.17.1. Characteristics of Health-care Wastewater

Health-care wastewater is any water that has been adversely affected in quality during the provision of healthcare services. It is mainly liquid waste, containing some solids produced by humans (staff and patients) or during health-care-related processes, including cooking, cleaning and laundry.[21] Health-care wastewater can be divided into the following three categories:

- Blackwater (sewage) is heavily polluted wastewater that contains high concentrations of faecal matter and urine;
- Greywater (sullage) contains more dilute residues from washing, bathing, laboratory processes, laundry and technical processes such as cooling water or the rinsing of X-ray films;
- Stormwater is technically not a wastewater itself, but represents the rainfall collected on hospital roofs, grounds, yards and paved surfaces. This may be lost to drains and watercourses and as groundwater recharge, or used for irrigating hospital grounds, toilet flushing and other general washing purposes.

Sources of healthcare wastewater include:

- Administration and wards
- Kitchen
- Laundry

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- Operating rooms and ICU
- Laboratories
- Radiology
- Haemodialysis
- Dental departments
- Toilets
- Engineering and maintenance department
- Runoff from paved areas,

8.17.2. Hazards of Wastewater from Health-care Facilities

A large part of the wastewater from health-care facilities is of a similar quality to domestic wastewater and poses the same risks. Just as domestic wastewater is considered to be potentially infectious, wastewater from health-care facilities must also be considered in a similar manner and precautions taken.

A proportion of the generated wastewater from health-care facilities will pose a higher risk than domestic wastewater. Depending on the service level and tasks of the health-care facility, the wastewater might contain:

- Chemicals including;
    - Anesthetics
    - Disinfectants (formaldehyde, glutaraldehyde)
    - Chemicals from laboratory activities
    - Photochemical solutions (hydroquinone), and
    - X-ray contrast media containing absorbable organohalogen compounds (AOX)
- Mercury from dental amalgams or laboratory chemicals;
- Excessive nutrients and nitrates;
- Pharmaceuticals, including antibiotics
- Radioactive wastes
- Infectious agents, including bacteria, viruses and parasites.

Sewers of health-care facilities are often not watertight, and a significant part of the wastewater in many places may leak into the groundwater. Often, hospitals are not connected to efficient, working sewage-treatment plants, and sometimes municipal sewerage networks may not even exist.

Improper management, collection, treatment and disposal of wastewater and sludge will result in the pollution of local drinking water sources, or the contamination of natural resources.

Health and environmental implications of improper management of healthcare wastewater include:

- Excessive nutrients that cause biological degradation in groundwater, lakes and rivers by using up oxygen (eutrophication) resulting in algal blooms and biotoxins;
- Pharmaceuticals in water may act as endocrine disruptors;
- Antibiotics could result in antibiotic-resistant pathogens;
- Mercury and heavy metal poisoning;
- Water-borne disease outbreaks in communities like Campylobacterosis, cholera, Hepatitis A and E, schistosomiasis, and typhoid fever;
- Numerous vector-borne diseases (e.g. malaria and filariasis) by providing breeding places for the vectors, and favours the spread of parasites (e.g. roundworms or Ascaris lumbricoides).

8.17.3. Quantity of Wastewater

The quantity of wastewater produced in a health-care facility depends on the amount of water used and is best measured by water consumption. The water consumption depends heavily on factors such as the kind of healthcare services provided, number of beds, accessibility to water, climatic situation, level of care and local water-use practices.

In primary health-care clinics, the rate of waste generation is often measured as the sum of the number of inpatients and outpatients. Minimum water quantities required in the health-care setting are (WHO, 2008):

- 40–60 l per inpatient; plus
- 5 l per outpatient; and
- 100 l per surgical procedure.

8.17.4. Quality of Wastewater by Hospital Department

Wastewater from health-care facilities contains organic particles (faeces, hairs, food, vomit, paper, fibres), soluble organic material (urea, proteins, pharmaceuticals), inorganic particles (sand, grit, metal particles), soluble inorganic material (ammonia, cyanide, hydrogen sulfide, thiosulfates) and other substances. The composition depends on the source of origin.

General medical areas generate wastewater comparable to domestic wastewater. The urine of patients from some wards (oncology, infectious disease) will probably contain higher amounts of antibiotics, cytotoxics, their metabolites and X-ray contrast media. Additionally, higher concentrations of disinfectants can be found.

Kitchens at hospitals often generate a polluting wastewater stream containing food leftovers, waste from food processing and high concentrations of disinfectants and detergents. Starch,

grease, oil and an overall high organic content have the potential to create problems during wastewater management.

Laundries are places where the highest quantity of greywater is produced. Often, the wastewater is hot, has a high pH (alkaline) and may contain high rates of phosphate and AOX if chlorine-based disinfectants are used.

Shower blocks also create large volumes of greywater containing dilute concentrations of detergents.

Theatres and intensive-care units generate wastewater with high contents of disinfectants (glutaraldehyde), detergents and pharmaceuticals. Additionally, the organic content can be high due to the disposal of body fluids and rinsing liquids (such as those from suction containers).

Laboratories are a possible source for chemicals in the wastewater stream. Of special relevance are halogenated and organic solvents, colorants from histology and haematology (Gram staining), cyanides (haematology) and formaldehyde and xylene (pathology). Laboratories may also contribute to the presence of blood in wastewater from the emptying of samples into the sinks.

Radiology departments are the main generator of photochemical (developing and fixing) solutions in wastewater and potentially contaminated rinsing water. In some countries, this source of wastewater contamination is declining due to the increasing use of digital X-ray technology.

Haemodialysis requires the disinfection of the dialysers and sometimes the used filters. Accordingly, the concentration of disinfectant in the wastewater can be high.

Dental departments can contaminate wastewater with mercury (amalgam) from the filling of dental cavities if no amalgam separators are installed in the sink waste pipe system.

Central sterile supply departments are one of the main consumers of disinfection solutions, including aldehydebased disinfectants. Hot water from the sterilizers and detergents from the CD-machine (cleaning and disinfectant) might also increase pollution load in the wastewater.

8.17.5. Collection of Liquid healthcare Waste

Segregation, minimization and safe storage of hazardous materials are just as important for liquid wastes as they are for solid wastes.

The two traditional collection arrangements are:

- "Central system" of sewage pipes bringing wastewater from throughout the facility to a central underground location for treatment or disposal; and
- "De-centralized system" wherein pipes from some medical areas pass wastewater to septic tanks or cesspits. (Not preferred approach for healthcare facilities)

A centralized collection and treatment system is the preferred and recommended approach for management of wastewater for health-care facilities especially in regional referral hospitals.

The recommended set-up for management of wastewater from healthcare facilities includes:

- Construction of two separate collection systems
    - Sewerage system for wastewater (sanitary sewers)
    - Stormwater system for rainwater (stormwater sewers), which can be used for gardens, toilet flushing or washing of paved areas
- Manholes to allow access for maintenance every 50 meters or less
- Watertight sewerage pipes and manholes
- Pre-treatment to reduce or eliminate contaminants in non-domestic wastewater, or in altering its nature before discharging it into the sewer.

8.17.6. Pre-treatment of Liquid healthcare Waste

The basic underlying principle of effective wastewater management is a strict limit on the discharge of hazardous liquids to sewers. Chemical and pharmaceutical wastes such as photographic chemicals, aldehydes, colorants and antibiotics should not be discharged directly into the sewer drains. The following pretreatment methods are recommended for the different types of hazardous liquids from healthcare facilities. (Table 8-8)

Table 8.8: Pre-treatment of liquid healthcare waste

Type of liquid waste	Recommended pretreatment method
Medical laboratory wastewater	Acid-base neutralization, filtration and sedimentation, or autoclaving Or should be separately collected, mixed with an absorbent (e.g., saw dust), and immobilized or encapsulated (Minimum approach)
Faeces, vomit or urine during an outbreak such as cholera	Decontamination with lime milk (hydrated calcium oxide or calcium hydroxide): Ratio of 1:2 for stool and vomit with lime for 6 hours minimum; Ratio of 1:1 for urine with lime for 2 hours minimum Or Should be thermally treated (e.g. in a waste treatment autoclave) and then discharged via the drain (Minimum approach)
Blood	Blood can be discharged in the sewer (using PPE to protect from blood splatter) if a risk assessment shows that the organic loading does not require pre-treatment. Otherwise, blood can be pre-treated by a thermal method or disposed directly into a septic tank if safety measures are used. *Note: 5% hypochlorite is not effective for high organic loads like blood*

Type of liquid waste	Recommended pretreatment method
Wastewater from the dental department	Installing amalgam separators in sinks, especially by patient treatment chairs; the separated mercury waste must be safely stored.
Radioactive wastewater from radiotherapy	Separate collection of radioactive wastewater (e.g. urine of patients from the thyroid treatment) and storage for decay in a secured die-away basin until background concentrations have decreased; after the required storage time, the wastewater can be disposed of in the sewer system
Kitchen wastewater	Installation of a grease trap to remove grease, oil and other floating materials from kitchen wastewater. The trap and collected grease should be removed every 2–4 weeks.
Note: Non-hazardous chemicals such as syrups, vitamins, or eye drops, small quantities of blood and rinsing liquids from surgical theaters can be discharged in the sewer system without pre-treatment.	

8.17.7. Healthcare Sewage System

The preferred method is to connect the healthcare sewage system to the municipal sewage system and to discharge healthcare wastewater after adequate pretreatment to municipal sewage if the municipal sewage treatment plant meets the following minimum requirements:

- Use of primary, secondary and tertiary treatment;
- Removal of >95% of bacteria;
- Treatment of sewage sludge to destroy helminth eggs to < 1 egg per liter;
- Compliance with local regulatory requirements.

If no municipal sewage system exists, or If the municipal sewage system does not meet basic requirements, or If the area experiences epidemics of enteric diseases or endemic intestinal helminthiasis, the recommended option is on-site wastewater treatment.

8.17.8. Onsite Wastewater Treatment

Large health-care facilities, particularly those that are not connected to any municipal treatment plant, should operate their own wastewater-treatment works. This could include physical, chemical and biological processes to remove contaminants from the raw sewage. The objective is to produce a treated effluent that is suitable for reuse or discharge back into the environment, usually surface watercourses.

Typically, wastewater treatment involves three stages, namely: (See Figure 8-9)

a) ***Primary treatment***

The purpose of this first stage is to prevent the damage or clogging of wastewater treatment equipment and to produce a generally homogeneous liquid capable of being treated subsequently

biologically or mechanically. A raked screen is used to remove large objects, after which the velocity of incoming wastewater is reduced to allow the settlement of sand, grit and stones. Floating material, such as grease and plastics, is skimmed off, and primary sedimentation tanks are installed to allow faecal solids to settle;

b) ***Secondary treatment***

The task of secondary treatment is to remove dissolved carbon and nitrogen components by microbial digestion. Bacteria and protozoa consume biodegradable soluble organic material (e.g. sugars, fats, organic short-chain carbon molecules) and bind much of the less soluble fractions into floc particles. These microorganisms require oxygen and a substrate on which to live.

c) ***Tertiary treatment***

Tertiary treatment, also called "effluent polishing", is the final step in a wastewater-treatment process before the effluent is discharged to the receiving environment. Tertiary treatment is to further treat the wastewater for the purpose of reducing pathogens, suspended solids, excessive phosphorus and nitrogen nutrients, and/or chemical contaminants.

Sand filtration, lagooning or planted horizontal gravel filters can be used to remove suspended organic matter. Constructed wetlands and engineered reed bed systems are another effective option.

Disinfection of wastewater from health-care establishments is often required, particularly if the wastewater is discharged into any water body used for recreational activities or used as a source of drinking-water.

8.17.8.1. Disposal of sludge

Onsite treatment of hospital sewage will produce a sludge that contains high concentrations of helminths and other pathogens, and should be treated before disposal. The most common treatment options include:

- **Anaerobic digestion** – This is a complex bacterial process that is carried out in the absence of oxygen and is mainly used for large-scale plants.
- **Aerobic digestion** -
- **Composting** - Where the sludge is mixed with a carbon source such as sawdust, straw or wood chips. In the presence of oxygen, bacteria digest the sludge and the carbon source, and create heat that will pasteurize the sludge.
- **Reed beds** – Here sludge is applied on a horizontal system – flow reed bed. One part of the water is absorbed by the reeds, which then transpire moisture into the air; the other part is returned to the wastewater treatment plant through a drainage layer in the bottom of the reed bed.

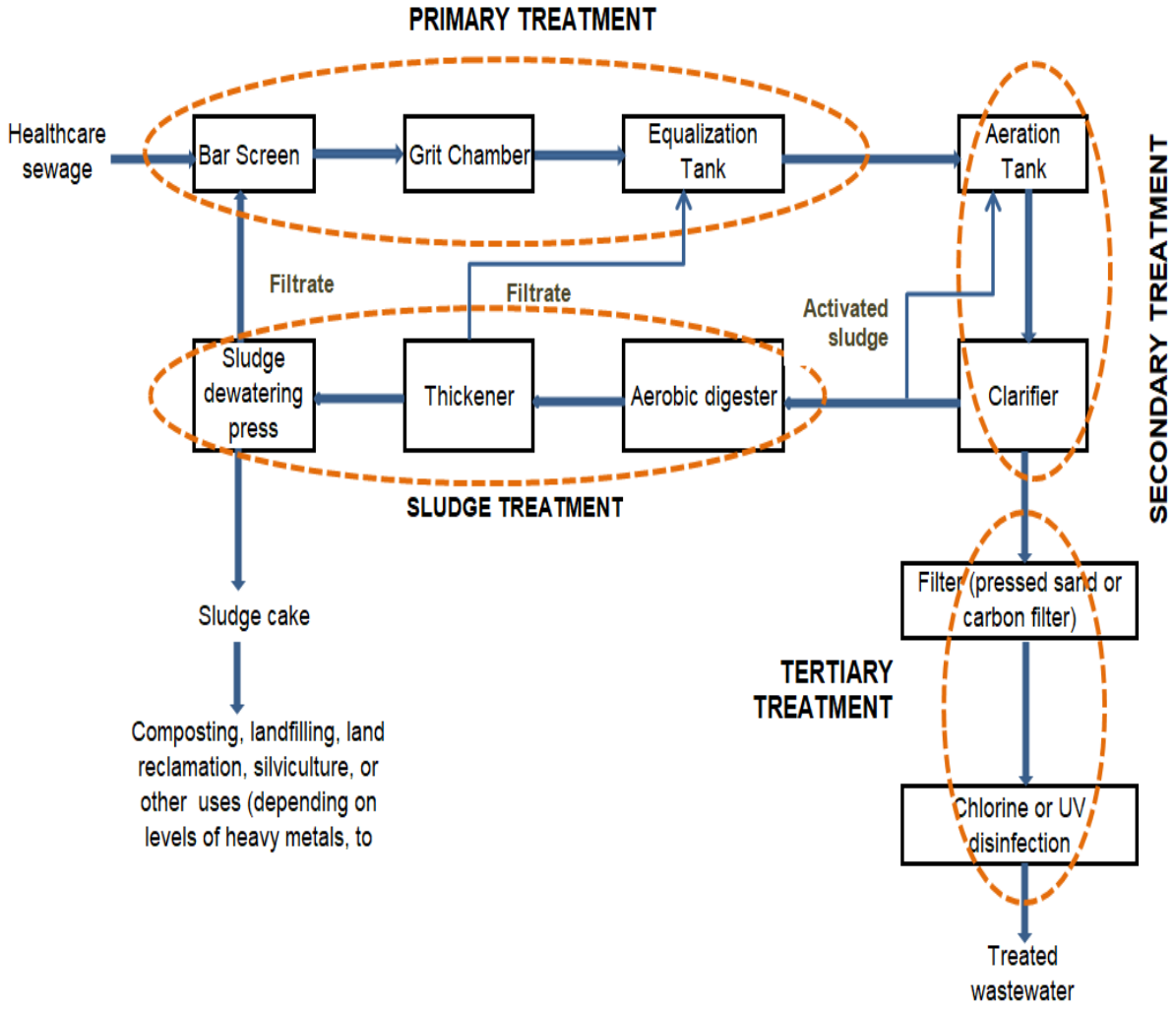

Figure 8.9: Illustration of On-site Wastewater Treatment for a Referral Hospital

8.17.9. Decentralized Septic Tank System

The minimum treatment method for wastewater is the septic tank, a watertight receptacle for the separation of solid and liquid components of wastewater and for the digestion of organic matter in an anaerobic environment. A septic tank also takes on the functions of storing solids and allowing clarified liquid to outflow for further treatment or discharge.

A septic tank normally consists of two or more chambers and can be divided into the following zones (see Figure 8-10 for illustration, detailed drawing is appended in Annex 1):

- Horizontal: inflow, settlement and clarifying zone
- Vertical: scum, detention and sludge zone.

The capacity of the septic tank should be equivalent to a total of two days' wastewater flow. If a two-chamber system is used, the first chamber should be two thirds of the total capacity. Access holes, inspection ports and ventilation should be installed in every chamber.

The wastewater enters the septic tank via a ventilated pipe. The heavier solid matter (sludge) falls to the bottom; fats and other lighter matter (scum) float to the surface. The effective settling and floating of solids is directly dependent upon the retention time within the tank, which should be not less than 24 hours. Anaerobic bacteria partly break down this solid matter.

Note that excessive build-up of sludge and scum reduces the capacity of the detention zone, resulting in discharge of suspended solids to the effluent disposal system. Solid matter (sludge, scum) from septic tanks must be removed when the chambers are half filled with sludge. If the level of solid matter cannot be controlled, it should ideally be removed once every two years.

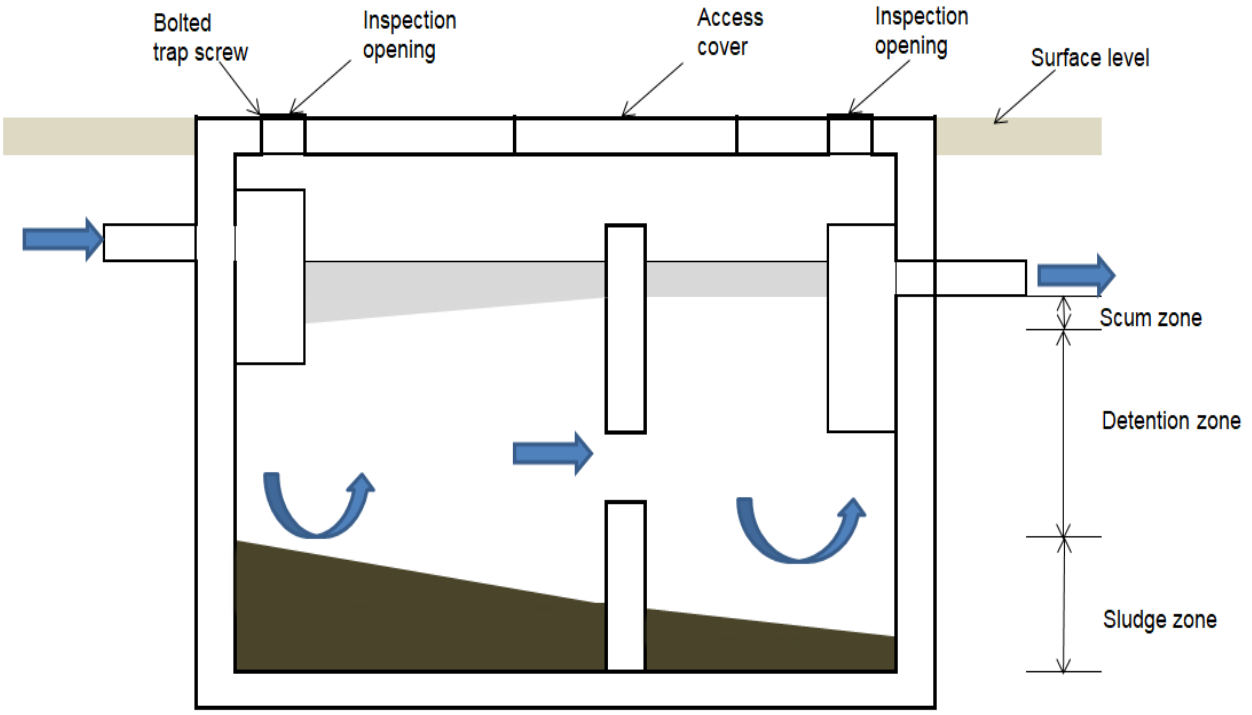

Figure 8.10: Illustration of a two Chamber Septic Tank

Source: Safe management of wastes from health-care activities –WHO Second Edition

8.17.10. Centralized, Basic System

Centralized onsite treatment is recommended for health-care facilities to minimize maintenance, allow more advanced treatment, and improve the monitoring of the wastewater system. Basic centralized systems consist of primary treatment (sand catchment and screen to remove large particles) and an anaerobic secondary treatment system. Typical secondary treatment systems include:

- Baffled flow reactors
- Anaerobic filters
- Imhoff tank
- Upflow anaerobic sludge blanket reactor.

The effluents can be further treated. If this is not possible, a controlled discharge to soakaway pits or leach fields should be carried out.

8.17.11. Soakaway pits and leachfields

A soakaway pit should have one or more tanks, with the total volume equal to the wastewater-treatment plant. Effluents from the treatment plant are collected and allowed to infiltrate into the ground. The pit may be filled with stones, broken bricks or similar material or may be lined with open-jointed masonry. The top 0.5 m of the pit should be lined solidly, to provide firm support for a reinforced concrete cover and sealed with cement mortar to prevent the infiltration of rainwater. Planting trees adjacent to or over a soakaway can improve liquid removal through transpiration and increased soil permeability.

The size of the soak pit depends on the volume of liquid to be disposed of and the type of soil in which the pit is excavated. Soak pits are commonly between 2 and 5m deep and 1 to 2.5m in diameter.

When larger amounts of wastewater need to be infiltrated (e.g. referral hospitals), a leachfield is often a better solution. Leachfields consist of gravel-filled underground trenches, called leach lines, which allow the liquid effluent from the wastewater treatment to permeate into the ground. Open-jointed (stoneware) or perforated (polyvinyl chloride) pipes carry the liquid effluent into the leachfield. The leach trenches are usually 0.3–0.5 m wide and 0.6–1.0 m deep (from the top of the pipes). The trenches are laid with a 0.2–0.3% gradient of gravel (20–50 mm diameter), covered by a 0.3–0.5 m layer of soil.

Soakaway pits and leachfields present a threat of contamination to nearby wells. Both should be kept as far as practicable from shallow water wells and, where possible, they should be installed downstream of water abstraction sources. The distance between the bottom of the infiltration system and the groundwater table should be at least 1.5 m (more in coarse sands, gravels and fissured geological formations), and the system should be at least 30 m from any groundwater source (Harvey, 2002).

8.17.12. Lagooning system

In a region or an individual health-care facility that cannot afford sophisticated sewage-treatment plants, and where infiltration of the wastewater is not possible, a Lagooning system is a basic solution for treating wastewater, if enough land is available (Figure 8-11). Lagooning systems are divided in facultative lagoons (oxygen is supplied primarily by algae) and aerated lagoons (oxygen is supplied by mechanical surface aeration). Mechanical aeration requires comparatively high operational costs (electricity); therefore, facultative lagoons are preferred.

Facultative means the presence of an anaerobic bottom region below an aerobic top layer. Facultative lagoons consist of a shallow basin in which settleable solids carried by the wastewater fall to the bottom and form a sludge layer that decomposes anaerobically. In the water column, the biodegradable organic materials held in suspension are degraded aerobically. Biodegradable

organic carbon is converted by bacteria to biomass and carbon dioxide, and the latter is used photosynthetically by algae to form algal biomass and oxygen. The oxygen required for aerobic decomposition is supplied by bacteria.

Facultative lagoons can have the disadvantages of potentially generating pungent odours, variable effluent quality and a need for a large land surface area. Reed bed systems perform a similar function to lagoons and are regarded as a preferable option if resources exist to establish them.

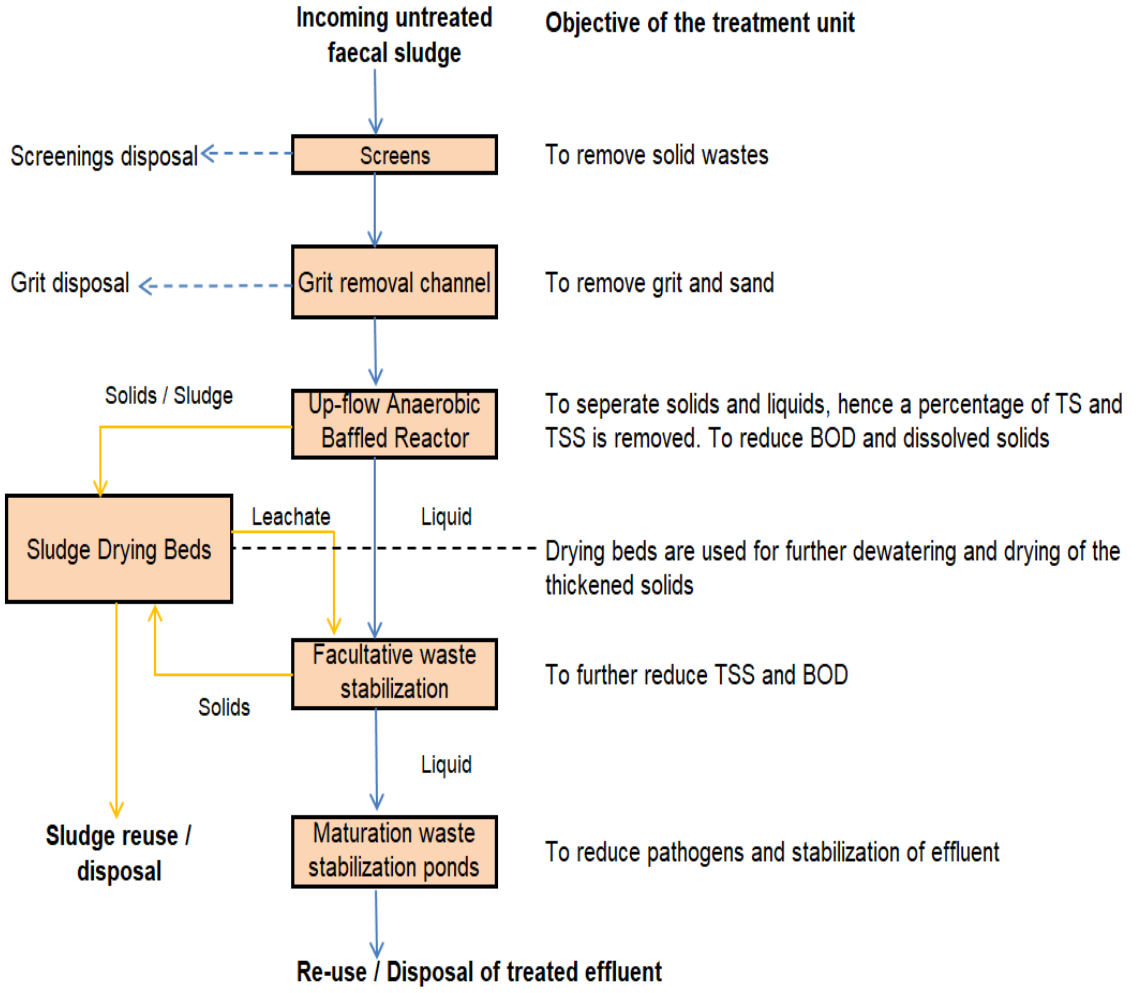

Figure 8.11: Treatment Processes for Waster Water Lagoons

Source: Kagga & Partners

8.17.13. Operation and Monitoring of Sewerage Systems

Problems in the management of wastewater in health-care facilities are mainly due to insufficient operation and maintenance. In most hospitals, the disposal of liquid hazardous waste via the sink is still practiced daily. Leakages and blockages are likely to increase where sewers are insufficiently maintained. Commonly, the first indication of a problem is large wastewater losses between the entry points (sinks, toilets, drains) and an onsite treatment plant or tank or discharge point into a municipal sewerage system.

8.17.13.1. Operation and maintenance of wastewater systems

Typical problems in the operation of wastewater systems include:

- Lack of awareness among senior staff at health-care facilities on wastewater problems;
- Insufficient or non-functioning pre-treatment and primary treatment systems, or no hazardous wastewater management system;
- Little or no programme of preventive maintenance;
- Non-availability of basic tools to carry out maintenance;
- Use of systems that are too complex to be operated by unskilled workers, or operational costs that are unbudgeted or too high to be affordable.

To ensure that wastewater-management responsibilities are taken seriously, a trained wastewater officer should be appointed. The starting point for developing a successful wastewater system is a wastewater audit, which would identify the expected wastewater streams from each medical and service area of the health-care facility, and provide data for pre-treatment, collection and treatment arrangements for wastewater to be developed. A maintenance plan to cover both corrective and preventive maintenance should also be prepared. If an onsite treatment plant exists, it must be included in the operations and maintenance plans, and a budget allocated to sustain operations.

8.17.13.2. Monitoring of wastewater systems

The monitoring of the wastewater system includes two aspects:

- Monitoring the sewerage system and
- Monitoring effluent quality.

An often-underestimated aspect in wastewater management is the loss of wastewater during collection and transport. Losses of 10–30% of the wastewater due to broken sewer pipes, non-watertight access holes and leakages at pipe connections are common. Installing a flow meter at the discharge point of the health-care facility is recommended for accurate monitoring. Maintenance and leakage problems can often be identified through regular (daily or weekly) comparison of water consumption and discharged wastewater quantities. The most common parameters for monitoring the effluent quality are:

- Temperature;
- pH;
- BOD5 (a test to estimate the amount of oxygen consumed by biochemical oxidation of waste contaminants in a five-day period at 20°C);
- Chemical oxygen demand;
- Nitrate;
- Total phosphorus;

- Total suspended solids;
- Presence and concentration of Escherichia coli.

If an onsite treatment plant is operated, the inflow of wastewater and the out flowing treated effluent should be tested regularly to monitor how efficiently the treatment plant reduces the concentration of contaminants.

CHAPTER 9: **CLEANING AND LAUNDRY MANAGEMENT**

9.1. Introduction

A clean environment forms the basis of sound infection prevention and control practices. This is because there is an important link between cleaning of health care facilities and persistence of nosocomial pathogens. The purpose of cleaning the environment is to remove visible dirt, reduce the level of microorganisms and to minimize the dissemination of infectious agents in the facility, thereby providing an aesthetically pleasing, sanitary and relatively contamination – free environment for patients, staff and visitors. Dust contains large numbers of skin scales, microorganisms such as bacilli and staphylococci, dried nuclei of mycobacterium tuberculosis. These are dispersed during dry dusting, weeping or shaking patient bedding. Thorough cleaning will remove 90% of microorganisms; therefore, it has to be done in standardized manner to avoid spreading of contamination.

9.2. Objective

- To maintain a clean environment for health care staff, patients, visitors and workers at the health care facility for infection prevention and control.
- To promote good hygiene practices and behavioural change in the catchment community.

9.3. Environmental Cleaning Program

An environmental cleaning program is a structured set of elements or interventions which facilitate implementation of environmental cleaning at a healthcare facility.

Environmental cleaning programs in healthcare facilities involve resources and engagement from multiple stakeholders and departments, such as administration, IPC, WASH, and facilities management. The scope of the environmental cleaning program and its implementation can vary (e.g. in-house management versus external contract), based on the size of the facility and level of services provided.

Regardless of type of facility, the key program elements for effective environmental cleaning programs include:

- Organization/administration
- Staffing and training

- Infrastructure and supplies
- Policies and procedures
- Monitoring, feedback and audit

9.3.1. Externally Contracted Cleaning Service Providers

Environmental cleaning programs are increasingly implemented by external companies through a contract or service level agreement. Contracted staff, including cleaning staff and cleaning supervisors, should work closely with the cleaning program focal person and IPC staff at the facility to ensure that cleaning is performed according to best practices and facility policy. It is essential that all the standard program elements be described explicitly in the service level agreement with the external company, to ensure accountability. In general, the components of the service level agreement should be similar to the facility cleaning policy, and at a minimum should include:

- An organizational chart for all contracted employees, including functional reporting lines and responsibilities;
- The staffing plan for each patient care area, including contingency plans for additional staff;
- The training content and frequency for contracted employees;
- Summary of the cleaning schedules and methods for each patient care area, in line with the facility policy;
- The methods for routine monitoring and feedback;
- The supplies and equipment to be used.

9.3.2. Organization / Administration

Facility-level organizational support is a key program element in the implementation of an effective environmental cleaning program. The main areas of support include:

- Administrative and leadership support – Required support from the healthcare facility administration for the environmental cleaning program includes a designated cleaning program manager or focal person whose responsibilities include;
    - Developing the facility-specific environmental cleaning policy and corresponding service level agreement or contract (as applicable).
    - Developing and maintaining a manual of standard operating procedures for all required cleaning tasks at the facility.
    - Ensuring that structured training activities are carried out for all new staff and on a recurring basis.
    - Ensuring that routine monitoring is implemented and results are used for program improvement.
    - Ensuring that cleaning supplies and equipment are available in required quantities and in good condition (i.e., preventing stock-outs).

- Addressing staff concerns and patient questions about the cleaning program.
- Communicating with the external company on any of the program elements (if applicable).

- Formalized communication processes and integration of the cleaning program and IPC - An effective environmental cleaning program requires strong communication and collaboration across multiple levels of the facility, at both the program development and implementation stages. The primary communication structures to establish include:

  - Multi-sectorial planning committee – Engages all facility stakeholders during the development of SOPs and service level agreements (if contracted services are used). This committee could include a representative from the IPC committee, a clinical staff representative from each ward, facilities management of WASH staff, and administrative staff in charge of procurement.
  - Routine meetings with key stakeholders, particularly those representing IPC facilitate regular communication between the cleaning program manager, IPC, and other stakeholders at the facility (e.g. ward in charge staff). These meetings should be conducted at least monthly.
- Defined management structure including organizational and reporting lines, and on-site supervision. The required elements include:

  - Cleaning program organizational chart
  - On-site supervisors

9.3.3. Staffing Elements

Appropriate number of staff and training are key program elements. Cleaning staff should be paid positions that have:

i) Written job descriptions or terms of reference;
ii) Structured, targeted training (e.g., pre-service, annual, when new equipment is introduced);
iii) Defined performance standards or competencies;
iv) Access to an on-site supervisor to ensure they can safely perform their work (e.g., address supply shortage, safety concerns).

The Environmental cleaning staff should:

i) Be familiar with their job descriptions and performance standards;
ii) Perform duties only for which they were trained (e.g., cleaning staff should not be asked to clean high-risk wards (e.g., operating room), unless they have received specific training for that patient care area);
iii) Know the identities and hazards of the chemicals that they could be exposed to in the workplace

iv) Have supplies and equipment, including PPE, to perform their duties.

Adequate staffing is one of the most important factors for an effective environmental cleaning program. In small primary health care facilities with limited inpatient services, cleaning staff might be part-time positions or have other responsibilities, such as laundry services, but most hospitals require full-time, dedicated cleaning staff.

The required number of cleaning staff will vary based on several of factors, including:

i) Number of patient beds
ii) Occupancy level
iii) Type of cleaning (e.g. routine or terminal)
iv) Types of patient care areas (e.g. specialized care areas such as ICUs and operating rooms)

Training for cleaning staff should be based on national or facility environmental cleaning guidelines and policies. It should be mandatory, structured, targeted, and delivered in the right style (e.g., participatory) and conducted before staff can work independently within the healthcare facility.

If cleaning services are contracted out, the training requirements and content should be specified in the service level agreement.

9.3.4. Supporting Infrastructure and Supply Elements

The facility infrastructure is critical for an effective environmental cleaning program. The main areas of needed infrastructure include:

i) Designated physical space for storage, preparation, and care of cleaning supplies and equipment. And separated sluice rooms or areas (soiled and clean) for reprocessing of noncritical patient care equipment. These areas must be available within the facility itself, regardless of whether the program is managed in-house or by external company;
ii) Access to adequate water and wastewater services/systems - Environmental cleaning requires large quantities of water and produces almost as much wastewater, which must be disposed of safely and appropriately to prevent contamination of the environment and surrounding community;
iii) Systems to procure and manage environmental cleaning supplies and equipment;
iv) Appropriate selection of finishes, furnishings and patient care equipment that can be effectively cleaned and are compatible with the facility disinfectant(s).

9.3.5. Policies and Procedural Elements

Healthcare facilities should develop cleaning policies, SOPs, checklists and job aids for implementation of an effective environmental cleaning program.

9.3.5.1. Cleaning Policies

The facility environmental cleaning policy provides the standard to which the facility will perform to meet the best practices and enables a common understanding among the staff of the required program and should always include the following elements:

i) Defined lines of accountability and functional reporting lines and responsibilities for all implicated staff;

ii) Cleaning schedules for every patient care area and noncritical patient care equipment, specifying the frequency, method, and staff responsible;

iii) Contingency plans and required cleaning procedures for environmentally hardy organisms and for outbreak management;

iv) Training requirements and performance standards for cleaning staff;

v) Monitoring methods, frequency, and staff responsible;

vi) List of approved cleaning products, supplies, and equipment and any required specifications on their use;

vii) List of necessary PPE and when hand hygiene action is recommended for staff and patient safety;

Cleaning Schedules

Cleaning schedules should provide details on key technical requirements for environmental cleaning including:

- *Frequency*
- *Method (product, process)*
- *Staff responsible for specific cleaning tasks*

Sample of a cleaning schedule in the Emergency Department

Area Description	Frequency	Person or Staff Responsible	Products / Technique
Waiting / admission areas	At least daily and as needed (e.g., visibly soiled, blood/body fluid spills)	Cleaning staff	Clean and disinfect: • high-touch and low-touch surfaces • floors
Consultation / Consultation areas	After each event/ case and at least twice per day and as needed	Shared cleaning possible (clinical staff and cleaning staff)	Clean and disinfect: • high-touch surfaces
Procedure areas include trauma areas for high acuity patientss	Before and after (i.e., between) every procedure	Shared cleaning possible (clinical staff and cleaning staff)	Clean and disinfect: • any surface visibly soiled with blood or body fluids • high-touch surfaces in the patient zone • floors in the patient zone

9.3.5.2. Standard Operating Procedures

Facility-specific SOPs for each environmental cleaning task are essential to guide cleaning staff practices. The SOPs should be developed and made readily available to cleaning staff, cleaning supervisors and other ward staff as needed for reference.

Environmental cleaning SOPs should always include the following elements:

i) The specific supplies and equipment needed for the cleaning session; refer to Environmental Cleaning Supplies and Equipment;

ii) Preparatory steps, including hand hygiene and required PPE session;

iii) Step-by-step instructions on the cleaning process, in the order they should be performed;

iv) Final steps, including collection of soiled cleaning supplies for reprocessing or disposal, safe removal of PPE, and hand hygiene;

v) Use manufacturer's instructions to develop SOPs and include:

- Preparation of environmental cleaning products (i.e., dilution, if applicable)
- Reprocessing of reusable cleaning supplies, equipment and personal protective equipment
- Reprocessing (i.e., cleaning and disinfection) of noncritical patient care equipment

PLEASE NOTE:

If an external company manages the cleaning program, the facility should provide their SOPs to the contracting company or, at a minimum, internally validate the company SOPs to ensure they are in line with the facility policy.

9.3.6. General Environmental Cleaning Techniques

The following general strategies will apply for all environmental cleaning procedures:

I) Conduct visual preliminary site assessment to determine if there is need for additional PPE or supplies, there are any obstacles or issues that could pose a challenge to safe cleaning or if there is any damaged or broken furniture or surfaces to be reported to supervisor;

II) Proceed from cleaner to dirtier areas to avoid spreading dirt and microorganisms. e.g. clean patient areas before patient toilets, clean low-touch surfaces before high- touch surfaces;

III) Proceed from high to low (top to bottom) to prevent dirt and microorganisms from dripping or falling and contaminating already cleaned areas e.g cleaning environmental surfaces before cleaning floors, cleaning bed rails before bed legs;

IV) Proceed in a systematic manner to avoid missing areas, for example, left to right or clockwise;

V) Immediately attend to body fluid spills.

9.3.7. General Surface Cleaning Process

The general surface cleaning process is outlined below:

I) Thoroughly wet (soak) a fresh cleaning cloth in the environmental cleaning solution;

II) Fold the cleaning cloth in half until it is about the size of your hand. This will ensure that you can use all of the surface area efficiently (generally, fold them in half, then in half again, and this will create eight sides);

III) Wipe surfaces using the general strategies as above (e.g., clean to dirty, high to low, systematic manner), making sure to use mechanical action (for cleaning steps) and making sure that the surface is thoroughly wetted to allow required contact time (for disinfection steps);

IV) Regularly rotate and unfold the cleaning cloth to use all of the sides;

V) When all of the sides of the cloth have been used or when it is no longer saturated with solution, dispose of the cleaning cloth or store it for reprocessing;

VI) Repeat process from step I).

Recommended methods of cleaning for the routinely used items are presented in Table 9-1.

Table 9.1: Recommended methods of cleaning for routinely used items

Item	Recommended Method of Cleaning	Remarks
Surfaces, walls, trolley tops, windows, doors and ventilators, bed cradles, bed stead and furniture	• Dump dusting with water detergent • Leave surfaces clean and dry • Materials needed should be designated for this purpose	Use warm water where available Beds should not be wooden.

Item	Recommended Method of Cleaning	Remarks
Floors	**Wet scrubbing**. Use 2 bucket system where available. One bucket contains soapy water. Another bucket contains clean water. Color code or label equipment/materials according to different areas to be cleaned e.g. blue buckets and blue rugs can be used for the general ward while red buckets and red rugs can be used to clean sluice rooms and treatment rooms. **Frequency:** Daily and whenever dirty	All materials used in cleaning should be properly washed and dried at the end of each cleaning session Cleaning rugs should be washed and boiled at the end of the day if separate boiling facilities can be arranged.
Equipment, e.g. urinals, bedpan, bowels and basins • If contaminated with blood/ body fluids • If stool is infected	• Wear heavy duty gloves • Disinfect with JIK • Scrub with detergent, rinse and boil, • Disinfect with 2% soluble phenolic	Disinfecting before washing is meant to protect staff who will handle/clean this equipment
Commodes	• Wash seat daily with hot water and detergent and dry with disposable towel • Wipe the seat with the large alcohol wipe after each use	• If visibly contaminated, remove soil with tissue. Wash with warm water and detergent and dry. • In case of enteric viral disease: wipe the commode with hypochlorite (1000 ppm av cl) • In case of enteric bacterial disease, use2% phenolic
Dressing trolleys	• Remove all items daily and wipe surface with warm water and detergents. Dry. Wipe over with 70% isopropyl alcohol • Discard all previous contents of open jars and bottles. Replace with unopened containers	• If opened jars are used, keep the volumes so that containers can be heat disinfected when empty • Do not top up open disinfectant containers
Curtains	• Change curtains frequently • Isolation room curtains should be changed with each terminal cleaning	
Kitchen	• All areas cleaned with water and detergent • All drainages covered with wire mesh to prevent blockages	• All food handlers should observe high level hygiene.

Item	Recommended Method of Cleaning	Remarks
Kitchen Utensils	• Wash with warm water and detergent. Food surfaces should be wiped with0.1% hypochlorite • Rinse thoroughly and leave to dry on rack	Kitchen staff should be screened for infectious diseases at recruitment and every 3 months All leftover food should be disposed off immediately to avoid vermin
Protective clothing	• All health care workers to put on uniforms in health care facilities • Reusable protective like plastic aprons and boots should be properly cleaned by the user at the end of the procedure or day • They should be wiped with Jik if blood spillages or spots have occurred.	Protective clothes should be left in the workplaces
Safety cabinets in laboratories	Use high level containment safety cabinets when handling infectious agents (e.g. Brucellosis, TB and Plague)	Protect health workers from Aerosols
Ambulance	• Wash with water and detergent daily • If there is any blood or body fluids decontaminate with 0.5% hypochlorite, then wash and dry	
Outside environment	• The health facility should be fenced off • Grass should be cut short • Paving and growing of glass to avoid bare ground should be done • Avoid littering of waste	
Bed and Cots	• Wipe with warm water and detergent • Dry	Disinfectant unnecessary unless contaminated with blood and other body fluids
Bed frames	• Wipe with warm water and detergent • Dry	Disinfectant unnecessary unless contaminated with blood and other body fluids
Bed locker	• Wipe with warm water and detergent. • Dry. Clean inside locker once patient has been discharged	

Adapted from the Uganda National Infection Prevention Guidelines, 2013.

9.3.8. Hygiene in Specialised Areas

The following are some of the areas in the healthcare settings that require special attention to achieve good hygiene.

- Operating theaters
- Intensive Care units (ICU)
- Premature units
- Labour suites
- Oncology units
- Burns units
- Isolation units
- Laboratory
- Dental units

9.3.8.1. General Considerations for Specialized Areas

Specialized areas should be treated as follows:

I. Cleaning equipment should be designated to particular areas. For example, in the operating theatre the cleaning equipment for the inner zone should be different from that of the outer zone;
II. Floors should be cleaned after every procedure and at the end of the day;
III. The walls should be cleaned from heights of 2.5 – 3 meters downwards;
IV. Proceed from high to low (top to bottom) to prevent dirt and microorganisms from dripping or falling and contaminating already cleaned areas;
V. Cleaning should be done with water and detergent;
VI. Immediately attend to body fluid spills and manage them by decontaminating with chlorine releasing agents 0.5 – 1% for 10 minutes and spot cleaning with water and detergent;
VII. Proceed from cleaner to dirtier areas to avoid spreading dirt and microorganisms. e.g. during terminal cleaning, clean low-touch surfaces before high-touch surfaces;
VIII. Clean main ward before cubicles in special care units.

PLEASE NOTE:

- *Use fresh cleaning cloths at the start of each cleaning session (e.g., routine daily cleaning in a general inpatient ward).*

- *Change cleaning cloths when they are no longer saturated with solution, for a new, wetted cloth. Soiled cloths should be stored for reprocessing.*
- *For higher-risk areas, change cleaning cloths between each patient zone.*
- *Ensure that there are enough cleaning cloths to complete the required cleaning session.*

Recommended methods of cleaning specialized areas are presented in Table 9-2.

Table 9.2: Recommended methods of cleaning specialized areas

Theater and labor ward	Method of Cleaning and frequency	Remarks
All surfaces e.g. • Operating tables, trolleys and shelves • Ceiling	• Dump dust daily with water and detergent • Use a high broom weekly to avoid dust and cobwebs	
Walls, windows seals and doors	Dump cleaning 2.5 – 3 m downwards daily with water and detergent	These should be washable materials
Floors	Scrub using a brush, with water and detergent and leave to dry Apply 0.5 – 1% of chlorine releasing agent depending on amount of spillage for 10 minutes and spot clean Frequency: • After every operation • Weekly cleaning of all equipment and areas	
Please note that the same method of cleaning applies to all the rest of special areas mentioned above		
Adapted from the Uganda National Infection Prevention Guidelines, 2013.		

PLEASE NOTE:

- *Designate cleaning materials to each patient area in intensive care unit*
- *Air entering these units should be filtered where possible*

- *Effective supervision of the cleaners is necessary*
- *Flowers can be a source of infection and should not be allowed tin special areas*
- *Environmental sampling should only be done if a possible source of infection is suspected*

9.4. Linen and Laundry Management

Hospital linen includes all textiles used in hospital except for the Macintosh or any other material used on mattresses. There are three categories of Healthcare Linen which include:

- Foul linen: Linen requiring sluicing before laundering such as babies' nappies
- Soiled linen: Normal used linen
- Infected linen: Linen that may require sluicing and disinfection before final laundering

9.4.1. Linen (and laundry) handling

The following are some of the best practices for linen (and laundry) handling:

i) Always wear reusable rubber gloves before handling soiled linen (e.g., bed sheets, towels, curtains).

ii) Never carry soiled linen against the body. Always place it in the designated container.

iii) Carefully roll up soiled linen to prevent contamination of the air, surfaces, and cleaning staff. Do not shake linen.

iv) If there is any solid excrement on the linen, such as faeces or vomit, scrape it off carefully with a flat, firm object and put it in the commode or designated toilet/latrine before putting linen in the designated container.

v) Place soiled linen into a clearly labelled, leak-proof container (e.g., bag, bucket) in the patient care area. Do not transport soiled linen by hand outside the specific patient care area from where it was removed.

vi) Reprocess (i.e., clean and disinfect) the designated container for soiled linen after each use.

vii) If reusable linen bags are used inside the designated container, do not overfill them, tie them securely, and launder after each use.

- Soiled linen bags can be laundered with the soiled linen they contained.

PLEASE NOTE:

Effectiveness of the laundering process depends on many factors, including:

- *Time and temperature*
- *Mechanical action*
- *Water quality (pH, hardness)*
- *Volume of the load*
- *Extent of soiling*
- *Model/availability of commercial washers and dryers*

Always use and maintain laundry equipment according to manufacturer's instructions

Always launder soiled linens from patient care areas in a designated area, which should:

i) Be a dedicated space for performing laundering of soiled linen;
ii) Not contain any food, beverage or personal items;
iii) Have floors and walls made of durable materials that can withstand the exposures of the area (e.g., large quantities of water and steam);
iv) Have a separation between the soiled linen and clean linen storage areas, and ideally should be at negative pressure relative to other areas;
v) Have hand washing facilities;
vi) Have SOPs and other job aids to assist laundry staff with procedures.

9.4.2. Personal Protective Equipment (PPE) for Laundry Staff

The best practices for personal protective equipment (PPE) for laundry staff include:

i) Practice hand hygiene before application and after removal of PPE;
ii) Wear tear-resistant reusable rubber gloves when handling and laundering soiled linens;
iii) If there is risk of splashing, for example, if laundry is washed by hand, laundry staff should always wear gowns or aprons and face protection (e.g. face shield, goggles) when laundering soiled linens.

9.4.3. Laundering Soiled Linen

The best practices for laundering soiled linen using a washing machine and dryer include:

i) Follow instructions from the washer/dryer manufacturer;

ii) Use hot water (70–80°C X 10 min) [158–176°F]) and an approved laundry detergent.

- Disinfectants are generally not needed when soiling is at low levels;
- Use disinfectant on a case by case basis, depending on the origin of the soiled linen (e.g. linens from an area on contact precautions).

iii) Dry linens completely in a commercial dryer.

If laundry services with hot water are not available, reprocess soiled linens manually according to the following steps:

i) Immerse in detergent solution and use mechanical action (e.g. scrubbing) to remove soil;

ii) Disinfect by one of these methods:

- Immersing the linen in boiling water or
- Immersing the linen in disinfectant solution for the required contact time and rinsing with clean water to remove residue

iii) Allowing to fully dry, ideally in the sun on drying lines.

9.4.4. Management of Clean Linen

The following best practices for management of clean linen should be followed:

i) Sort, package, transport, and store clean linens in a manner that prevents risk of contamination by dust, debris, soiled linens or other soiled items;

ii) Each floor/ward should have a designated room for sorting and storing clean linens;

iii) Transport clean linens to patient care areas on designated carts or within designated containers that are regularly (e.g. at least once daily) cleaned with a neutral detergent and warm water solution.

CHAPTER 10: **VECTOR CONTROL AND LANDSCAPE**

10.1. Introduction

Vector/vermin control in HCFs is critical to preventing the spread of diseases between patients, and staff. Controlling or preventing vector and vermin helps to eliminate the high cost of treatment that comes with management of vector/vermin-borne diseases. This chapter presents the types of vectors and vermin recorded in HCFs and proposes methods of their control.

10.2. Objectives

For effective management of vectors and vermin that are harmful and impact adversely on the health care facilities, health care activities and spread of diseases and infections. To create a pleasant and healthy physical environment at the health care facility premises that benefits patients, caretakers, visitors and staff.

10.3. Vectors and Vermin

Regular visual inspection of health care facilities in search of signs of presence of vectors and vermin should be incorporated into the routine maintenance protocols. The following types of vectors and vermin are most common at the health care facilities and their presence can be detected by citing damage caused, alive or dead individuals, droppings and smells:

i. Mammals: Bats are among the most commonly cited vermin in the health care facilities. Apart from posing risk of zoonotic diseases, they pollute the air by causing a foul smell in their environment.

ii. Rodents: Rats are the commonly cited rodents in the health care facilities. Problems caused by rats include; damage to equipment and personal properties as they prepare for nesting, nibbling on food stuffs resulting into waste as the food is disposed of, and introducing vectors like fleas.

iii. Reptiles: These may include snakes. Although many snake species are not poisonous, seeing one particularly indoors may cause nervousness, stress or stampede.

iv. Insects: These include bed bugs, cockroaches, termites, bees, mosquitoes, etc. Insects are the most successful class of the animal kingdom and are thus difficult to control.

v. Birds: Birds that nest inside houses are not aggressive to humans but cause foul smells from the debris they collect in their nests. The debris and birds themselves could harbor mites which can cause allergic reactions in some people.

10.4. Controls

The following methods of controlling vectors and vermin may be employed:

10.4.1. Architectural and Engineering Designs Considerations

i. Ventilators of ceilings and similar openings should be fitted with netting material to block access of rats, bats and birds into the ceiling from the outside environment;
ii. Avoid 'dead spaces' and crevices between walls and furniture (cabinets, wardrobes, etc.) because they attract rats and cockroaches as nesting places. They also gather dust because they are difficult to clean and ultimately attract various insects. The dust may also cause allergies to people;
iii. Use well-fitting window screens to eliminate entry for insects, birds and bats;
iv. In areas with heavy infestations of termites, use of metallic installations should be considered over wooden ones. Wooden installations like door frames etc. attract termites into the buildings;
v. Use of translucent roofing sheets eliminates bats as they prefer dark environments.

10.4.2. Fumigation and application of pesticides and insecticides

Chemical methods of prevention and control of vectors and vermin are very effective but they are not environmentally friendly. Fumigation employs use of highly poisonous gases which may leak into the surrounding environment beyond the health care facility. Therefore, skilled personnel should be hired to conduct the fumigation exercises. Fumigation may be done once or twice a year depending on the levels of infestation and type of vectors involved. Advice of a skilled fumigator should be sought on the frequency of fumigation. It should be noted that over fumigation may lead to chemical resistance developing in the vector population. The following should be considered:

i. Only use skilled personnel to fumigate;
ii. Use poisons carefully placed within the pathways of the intended vector or vermin to avoid unnecessary killing of other animals. In as far as possible, poisons specific to a particular species should be used;
iii. Use of repellants. Napthalene is effective for many vectors but use of repellants in general is discouraged because people who spend long periods in rooms where the repellants are applied get exposed by inhaling the chemical fumes. Use of repellants should be limited to rooms that are not permanently occupied;

iv. Insecticides/pesticides can be used to treat small local infestations and to prevent build-up of populations. Pyrethrins are recommended because they are not very toxic to people and do not persist in the environment;

v. Desiccant dusts are put in cabinets where insects are known to occur. Desiccant dusts contain silica which desiccates the insects.

10.4.3. Preventive Measures

The physical environment should be made unsuitable for vermin and vectors by:

i. Keeping the surrounding lawns with short grass;

ii. Avoid having crop gardens close to the facility buildings;

iii. Avoid planting trees or shrubs that attract the known vermin in the local area; e.g bees forage on species of Calliandra (see figure 10-1) yet they are often planted for ornamental purposes;

iv. Growing plants that repel certain vectors and vermin, e.g. Tagetes minuta is known to repel both mosquitoes and snakes, onions, garlic, tobacco and lemon grass are known to repel snakes;

v. Installing air conditioning where/if possible and the temperature maintained at 20 – 23° C, which range is comfortable for people but is too low for insects to survive and breed;

vi. Keeping the environment meticulously clean; dusting as frequently as necessary, eating only in designated areas as scavenging vectors and vermin easily locate dropped food particles, and appropriately disposing of garbage; thus eliminating breeding and harborage sites

.

Figure 10.1: Calliandra growing at a HCF

10.4.4. Use of traps

Strategically placed traps can be used to capture or monitor presence of adult vectors and vermin. Traps help to control small infestations of vectors and vermin by reducing the population level or by interrupting the breeding cycle. Large infestations need to be handled by chemical methods.

10.5. Landscaping and Gardening

Outdoor environments that are attractive and appealing address the emotional and psychological needs of patients, care takers and staff. There is growing scientific evidence that viewing gardens can reduce stress in patients and treats the anxiety that may accompany illness, thus generally improving the health outcomes. While designs of HCFs tend to focus on reducing risks of infections, emphasis should also be put on creating environments that have pleasant and stress reducing characteristics.

10.6. Landscape and gardening features

With regard to the general topography of the area, landscape designs may require modifying the contours before construction of structures and creation of gardens. Ground leveling to create terraces along hilly topographies creates beautiful and organized designs, and guides the location of walkways along comfortable gradients for both walking and wheelchair patients.

The general principle that should be put into consideration while preparing landscape designs is site safety. The outdoor environment should not in any way endanger the lives of people. Site safety may be linked to several other principles detailed below.

10.6.1. Types of landscapes

10.6.1.1. Natural Landscapes

These refer to the outdoor environment that largely comprises of plants. Appropriate plants should be chosen for the different areas that are included in the landscape design following these as general principles;

i. Avoid growing poisonous plants even when they add beauty to the landscape. Consultations should be made with botanists for advice. For example, some ornamental plants belonging to the Araceae family, like Syngonium sp (Figure 10-2) are poisonous.
ii. Many invasive plant species are ornamental yet they pose harmful effects to the ecosystems. Examples include: Datura stramonium, Cestrum Aurantiacum, Rubus niveus, Leucaena leucocephala, Senna spectabilis etc. These must be avoided and advice of specialists should be sought.

Figure 10.2: A poisonous plant, Syngonium sp

10.6.1.2. Built Landscapes

Built landscapes refer to both permanent and semi-permanent constructions including buildings and shades. For these landscapes:

i. A warm and welcoming effect should be created at the entrance using colourful flowers, ornamental shrubs and trees that exhibit various effects of shape and size; The therapeutic effects of plants help to calm down patients and reduce anxiety.

ii. Waiting areas (built or tents) need to be beautified with potted plants. The floor where tents are used should be paved to avoid the dusty bare grounds that form as a result of over trampling. Dust can harbour vectors like flees;

iii. View of the outdoor environment should be made possible by locating windows such that patients who are unable to move out can also experience the beauty and calm that is created by the beautiful gardens;

iv. Trees should not be so much isolated from the buildings because they give a cooling effect onto the houses during the hot seasons, yet they should not be too close or too many as they may cause the interior to feel chilly. Trees that are too close to buildings can cause damage to the building by the roots cracking the foundation and walls;

v. Crevices that develop on the building along verandas or in the walls should be repaired immediately because the crevices could form hiding places for vectors and vermin. The crevices can also accumulate soil, giving a good substrate for plants to grow. This

weakens the building as the roots of the plants penetrate the walls e.g. as is the case with many figs.

10.6.2. Physical Features

Physical features at the health facility premises include:

10.6.2.1. Grass

This is the main component of lawns. Lawns should be kept meticulously clean and with short grass. The choice of grass species for the lawns will depend on the general climate of the area and the local habitats at the premises. Recommended features within the lawns should include:

i. Sitting and resting places with benches and tables. These may accelerate recovery through psychological feeling of body renewal. Both private and group seating should be availed. Group seats encourage human interaction but can also be a source of infection. Patients with infectious diseases should be advised to isolate by taking the private seats.
ii. Children's play areas. Recuperating and visiting children may want to be active. Play areas should offer a wide assortment of items and activities. The ground in these areas should be safe; either with sand or a grass species that will withstand trampling. Concrete surfaces should be avoided here.

10.6.2.2. Shrubs and Trees

These are planted for beauty and creating a relaxing environment by reducing stress and anxiety. Trees in particular (as well as large shrubs) help in the control of dust thus cleaning up the environment. They also attract birds, insects and various animals depending on the tree/shrub species. The following principles should be followed when planting trees/shrubs:

i. The species of trees/shrubs chosen should not be the types favoured by animals that are locally considered as vermin/vectors;
ii. Locally used medicinal plants that don't require harvesting by debarking or uprooting may be considered for planting;
iii. Ornamental fruit plants may also be planted because they could supplement diets of patients;
iv. Ornamental trees/shrubs should be positioned so that they are visible from inside too;
v. Shade trees should be planted and the areas designated as resting places, fitted with seats.

10.6.2.3. Driveways and Parking Spaces

These should be safe and clean. Specific principles should include:

i. They should be fitted with clearly visible signs for directions. The signposts should be large and easy to see from a reasonable distance, standing at a height of five to six feet (eye level for average height persons), with contrasting background and word colours (e.g. white background with black words). Choice of colour of signage should not blend with the background vegetation or buildings but instead contrast with it for easy siting.

ii. Trees that drop heavy parts like large palm leaves, fruits or branches are potentially dangerous and shouldn't be planted along driveways and parking spaces;

iii. Regular monitoring of the surfaces should be observed to ensure that they are always levelled. Potholes should be filled up and protruding parts should be levelled.

The figure 10-3 below shows a well-leveled and paved parking space, with a clear signpost at one of the exits. The signpost is not obstructed by surrounding vegetation, and is written in large dark-coloured words on a white background.

Figure 10.3: Good landscaping; Paved parking space with clear signage

10.6.2.4. Walkways

Presence of walkways could encourage exercising while preserving the beauty of the lawns, i.e. by preventing formation of unwanted paths across lawns. Specific principles that would guide designing walkways should include:

i. Surfaces need to be paved. This would be essential in maintaining good personal and environmental hygiene through the wet and dry seasons of the year.

ii. The surfaces should be smooth but slip proof, with nothing to cause tripping; there should be regular monitoring for presence of sunken or protruding pavers and these should be attended to as soon as they are discovered.

iii. The walkways should be spacious enough to allow comfortable by-passing of walking parties, side-by-side walking of patient and supporting person, and wheel chair pushing.

iv. When used, ornamental bushes lining the walkways should be far enough to avoid clinging of clothing, wheel chairs, etc. on to the bushes as this could result into accidents.

v. As far as possible, lights should be installed along the walkways.

vi. Hand rails need to be installed where the gradient is high.

The figure 10-4 below shows a paved and roofed walkway, lined with a well-maintained hedge that is trimmed off the pavement. It also shows a clean and well-kept lawn with short grass, without crisscrossing footpaths created by trespassing.

Figure 10.4: A good landscape – An example of an ideal walk way and garden

10.6.2.5. Storm Water Drainage

Stormwater drainage systems should be designed in accordance with the approved national engineering standards to adequately and safely convey the stormwater flowing on the HCFs premises to avoid flooding and nuisance of deposits carried by the stormwater.

The storm water drainage systems may comprise of the following:

- Lined open channel drains

  The lining material may include the following:

  - Grass
  - Stone masonry
  - Concrete
- Covered lined channels
- Closed stormwater sewers
- Culverts, and
- Outfall structures.

10.6.2.6. Fences

Fences serve purposes of demarcating the boundaries of the facility, providing security and keeping off stray domestic animals. The choice of fence type to be used should be guided by the local housing plans of the cities/towns. Where there is freedom of choice then factors like financing (development and maintenance) should be considered.

Live fences have the advantage of contributing to cleaning up the environment through air purification and dust control, and the main disadvantage of requiring regular maintenance which may be costly. Wall fences, barbed wire and chain links may be expensive to install but require less frequent maintenance and are therefore cheaper to maintain in the long run. Various combinations of fence types may be used depending on the special needs of the facility, for example, a live fence enforced with chain link or barbed wire is recommended in areas where domestic animals seek grazing or resting places within the facility premises.

CHAPTER 11: **OPERATION & MAINTENANCE OF WASH FACILITIES**

11.1. Introduction

It is critical that all WASH facilities are kept fully operational and clean to reduce transmission of diseases. Poorly maintained or unclean facilities will deter people from using them, and can become an epicentre in transmitting various diseases. There is a need to ensure clear management arrangements and planning for costs and O&M requirements before installation of the facilities.

11.2. Objective

For sustainability of effective WASH facilities at health care facilities.

11.3. Operation and Maintenance Requirements

O&M may be carried out by the dedicated health care staff or contracted to a private company or CBO through a service level agreement. The monthly or annual operating cost must be estimated so the management can budget accordingly. Costs may include the water supply, consumables (soap, cleaning products, PPE for cleaners etc), staff costs, monitoring, repairs and eventually replacement of the worn-out facilities. O&M planning and budgeting should be a key aspect under here as it is the starting point for the above listed activities.

11.4. Operation and Maintenance of WASH Facilities

WASH infrastructure and facilities must be kept clean and in good order with good planning and provision for maintenance services. WASH facilities need to be regularly checked for proper operation and sustainability. Table 11-1 shows the activities to undertake in regular checking for operation, cleaning and maintenance requirements of the WASH facilities. These should be practiced regarding the maintenance of WASH facilities.

Table 11.3: Routine for Operation and Maintenance of WASH Facilities

WASH Facility	Daily	Weekly	Monthly	Annually
Toilets/latrines	• Clean the slab/floor with soap and water • Presence of cleaning schedule with when to clean facility and supply of cleaning and hygiene agent. • Check for the internal locks on the doors • Appropriate anal cleansing material that is biodegradable • Check if squat hole cover is tightly fitted and has a firm handle • Ensure the surface water continues to drain away from the toilet facility. • Ensure clean handwashing facilities close to the toilet. • Check walls for faeces and clean (if any) • Ensure clean washrooms and refill water tanks (if any)	• Inspect the slab for cracks and holes • Check plaster seal to superstructure bricks • Presence of functional door that provides privacy • Availability of protective gloves and boots for cleaning	• Check superstructure for damage and maintain if at all • Check for any damage of vent pipe and corrosion of the screen • Check that the latrine or septic tank is not full. • Dead flies, spider webs, dust and other debris should be removed from the ventilation screen to ensure a good flow of air in VIP Latrines	• Check superstructure for damage and maintain if at all • When full pit or septic tank, hygienically empty it.
Handwashing facilities	• Ensure presence of person(s) responsible for water refilling and cleaning of handwashing facilities. • Check on presence of stock for cleaning supplies • Presence of water and soap at handwashing stations. • Check taps and tanks for breakage	• Path to the facility clear and accessible • Check whether soak pit/ drain/waste bucket are operational		

WASH Facility	Daily	Weekly	Monthly	Annually
	• Check operation of pedal mechanism or foot pumps • Check for obvious smell or high turbidity in water • Check if the handwashing facility and its components are visibly clean • Check is there is any stagnant water around the base			
Incinerator facility	• Check for evidence of cracks on brickwork • Perform simple repairs • Keep area clean and disinfected • Carefully sweep the area around the incinerator • Clean tools and equipment • Store healthcare wastes in an orderly manner • Maintain fuel stock levels	• Clean the chimney to remove soot • Remove lumps of melted glass/plastic and clean grate • Reinstall grit after cleaning • Ensure the fencing is intact • Check cement seal to bricks	• Ensure fencing is intact • Check vertical fixings of the chimney • Check cement seal to bricks • Check the ash door for corrosion and damaged hinges • Take inventory of condition of tools and equipment	• Inspect and replace metal parts, bricks and consumable parts • Check status of the ash pit • Perform annual adit
Handpump borehole	• Carry out a early morning test to check if the foot valve holds water in the rising main overnight • Check whether the pump delivery is normal or low • Check if the pump is firmly fixed in place • Check for loose nuts and bolts on the hand pump	• In addition to the daily checks tighten all the above ground nuts and bolts with a spanner • Clean the accessible moving parts	• Carryout the weekly checks.	• Dismantle the pump head parts remove the connecting rods, piston assembly and foot valve • Inspect all the parts, replace worn or defective parts like piston seals

WASH Facility	Daily	Weekly	Monthly	Annually
				• Straighten bent connecting rods or replace rods with badly corroded threads, replace corroded or missing connecting rod lock nuts • If connecting rods show severe corrosion, remove the rising main, check the rising main and replace badly corroded pipes. Check the threads in particular, clean pipe threads and install the rising main. • Re-assembled and replace the below ground parts, assemble the pump head, check the pump operation and pump until the water delivered is clean. • Record all significant actions. • Repair cracks with cement mortar in the pump platform and drain.

WASH Facility	Daily	Weekly	Monthly	Annually
				• If pump mounting bolts become lose in the concrete platform, remove pump, breakout old bolts and remount in fresh concrete.
Powered / Motorized borehole		• Pump Element As the pumping element is water lubricated, it should not require service. However, if service or replacements become necessary, the work can be carried out on the site without special tools • Packed Glands The gland should be inspected and adjusted regularly to provide the correct lubrication with a slight leakage. The gland packing should be replaced approximately every 5,000 hours, or sooner if the gland shows signs of excessive leakage. Grease gland bolts and nuts at each inspection • Bearings are rated for operation in excess of 10,000 hours. However, wear will occur quickly if bearings are allowed to operate without lubrication or under dirty conditions, or if overloaded due to excessive belt tension • Open Cage Bearings Check every 5,000 hours. Wash thoroughly with solvent. Repack with high speed ball bearing grease. Sealed bearings require no attention • Belt Tension Belt tension should be checked during gland inspections. If belts need replacement, replace ALL belts with a matched set • Column, Driveshaft, Bobbin Bearings Need for replacement of any worn or defective units will be obvious from visual inspection, but as withdrawal of column and driveshaft assemblies, and the pumping elements, requires time and effort it is wise always to replace any items which are suspect • The pump stator is natural rubber moulded inside a metal tube, and should not be lubricated with any petroleum-based products (i.e., hand cleaner, grease etc.). Stators to be fitted with suction end (marked on stator) towards the foot valve		

11.5. Approaches to HCF O&M

The HCF O&M strategy should largely be based on the preventative approach with limited room for corrective and reactive approaches.

11.5.1. Preventative Maintenance

This approach extends the lifetime of WASH infrastructure, saves costs in the long-term and also reduces the frequency with which expensive reactive maintenance or emergency backup solutions are required (HARVEY 2015). The approach requires that O&M work is planned, adequately scheduled and carried out on a regular basis to maintain and keep the WASH infrastructure in good condition. This approach includes activities such as routine inspections, network inspection, disinfection of water tanks, cleaning and greasing of mechanical parts, emptying pit latrines, undertaking minor repairs and replacement of items with a limited lifespan.

11.5.2. Corrective maintenance

The HCF periodically assesses WASH infrastructure replacing or repairing something that was done incorrectly or that needs to be changed: an example is the reallocation of a pipe route or replacement of a faulty pump, inappropriate taps at hand washing facilities in light of the COVID 19 pandemic among others.

11.5.3. Reactive maintenance

The HCF should develop a clear detailed O&M crisis response plan to adequately respond to a WASH crisis or client complaint due to failure and or malfunctioning or breakdown of WASH equipment. This is best handled by flexibility to request for funds to locally procure spare parts and engage locally available skilled personnel to repair the malfunctioning system.

11.6. Operation and Maintenance requirements

Requirements for the operation and maintenance of WASH facilities include the following;

- Staffing and manpower
- Tools and equipment
- Supplies
- Financing requirements

11.6.1. Staffing and Manpower

Except for the simple cleaning of surfaces, O&M staffing shall be qualified technical personnel for the specialized respective WASH facility / equipment.

The required number of staff shall be as determined by the HCF In-charge for the efficient and effective WASH services in the HCF.

HCFs should set up a WASH committee that bear the responsibility to plan, budget, monitor and maintain WASH facilities. The committee increases a sense of ownership and accountability to operate and maintain the HCF WASH infrastructure, reduce reliance on outside assistance, and offer a measure of sustainability.

I) Depending on the facility committee should consist of an in charge, supervisor(s), and attendant each with assigned responsibilities in relation to maintaining sanitation infrastructure.

II) In order to properly plan for O&M activities and inspections, daily, monthly, quarterly and annual work plans should be developed along with a clear procedure for reporting gaps or problems with the WASH infrastructure.

III) Specific WASH O&M roles and responsibilities for all facility staff cadre such as administration, coordination and management should be determined, agreed upon and communicated to all staff, partners and the HCF WASH committee.

IV) To ensure that WASH services are reliable, spare materials and parts for repair and maintenance should always be should if possible be sourced from local stores and vendors.

11.6.2. Tools and Equipment

The required number of tools and equipment for the operation and maintenance of the WASH facilities shall be determined by the HCF In-charge.

Tools and equipment for the operation and maintenance of specialized facilities including electro-mechanical equipment shall be in accordance with the manufacturer's recommendations.

11.6.3. Supplies

Recommended supplies for normal usage and operation of WASH facilities shall be in sufficient quantities and standards for effective and efficient operation and maintenance of the WASH facilities.

11.6.4. Financial Requirements

The financial requirements for the provision of the above requirements are to be determined by the HCF In-charge together with the HCF staff.

HCF budgets should always include a component for O&M and should include flexibility to deal with unforeseen challenges. Additionally, mobilizing the community for O&M and creating WASH committees to take over responsibilities for WASH significantly reduces maintenance costs.

11.7. Monitoring for HCF WASH O&M

Detailed monitoring is an important aspect of O&M. It helps to Maintain an overview over the state of existing facilities, Flag problems prioritizes assistance based on risk and Monitor effects of interventions.

11.8. Maintenance Workforce Arrangements

Routine and periodic maintenance services are only possible if staff have maintenance plans incorporated in their daily facility routines. They should thus: -

(i) Establish a committee comprising of key staff including health in charge, nurses/ midwives, supervisor(s), and patient attendant(s) with clear roles and responsibilities

(ii) Have clear sanitation infrastructure maintenance roles and responsibilities

(iii) Have a description of staff roles on management of sanitation infrastructure and services.

(iv) Have new patient and care giver sanitation facility use and maintenance orientation schedules

(v) Hold daily sanitation facility maintenance orientation sessions for new patients and care givers

(vi) Develop and regularly review sanitation operation and maintenance plans including include regular or incidental repairs and scheduled maintenance.

(vii) Regularly monitor and review the implementation of the facility sanitation and hygiene SoPs using the developed Monitoring tools.

(viii) Conduct, document and report facility cleaning and maintenance inspections activities.

11.9. HCF WASH O&M Services

HCF WASH infrastructure requires careful organization and actions to ensure smooth operations and provision of maintenance services in case of structural or functional changes. HCFs should consider implementing the following activities to bolster WASH O&M:

i) Operation and maintenance plan must be put in place to cover for the running and repairs of sanitation infrastructure and services. This should include regular or incidental repairs and scheduled maintenance activities.

ii) Toilets should be cleaned whenever they are dirty, and at least thrice a day with a disinfectant used on all exposed surfaces and a brush to remove visible soiling. Strong disinfectants are unnecessary and should not be used in large quantities (reference: Essential environmental health standards in HCF, 2008).

iii) There should be weekly and daily cleaning schedule that specify when sanitation facilities should be cleaned and supplied with cleaning and hygiene agents. Cleaning schedule should identify persons or groups responsible for undertaking the cleaning

tasks and their supervisors. The schedules should be displayed for easy access and be shared among responsible managers.

iv) Orientation, training, and education of users is an important aspect of operations that must be implemented. Orientation materials, personnel and time should be dedicated to help new comers, regular visitors, and staff members.

v) Monitoring tools for sanitation in Health Care facilities will be developed centrally. It will be the responsibility of each individual facility to obtain tools for monitoring and evaluation exercise, and to make sure that they are being implemented on time.

vi) Faecal sludge should be emptied when the septic tank is ¾ full. Cleaning and maintenance inspection activities should be documented and reported in weekly meetings.

vii) Maintaining cleanliness and ensuring good level of hygiene for HCF compound and WASH facilities.

viii) Promote hygiene to foster a sense of accountability towards maintaining HCF hygienic conditions and thereby strengthening and sustaining HCWs, patients, attendants and visitor's motivation to properly maintain and operate WASH facilities. When planning for WASH facilities, it is important to note that health may not be the strongest determinant for encouraging people to maintain facilities but rather aspects such as privacy, safety and convenience, as well as observation of culture and religious norms, protection of social status and self-esteem.

ix) Supervising and facilitating participation and empowering ownership over maintenance of HCF toilets/latrines facilities.

x) Carrying out vector control.

xi) Ensuring continued safe access to sanitary facilities including convenient design and lighting of sanitary facilities.

xii) Ensuring water supply infrastructure functions well (consistent fill rate) and that the lifespan of water supply facilities is maximized.

xiii) Carrying out continued desludging.

CHAPTER 12: **PLANNING, BUDGETING AND PROCUREMENT**

12.1. Introduction

The provision and maintenance of WASH services and facilities in a HCF depend on robust planning, budgeting, procurement and maintenance. Robust planning can facilitate immediate, incremental investments in WASH leading to continuous availability of WASH services. This supports core universal health care aspects of quality, equity, and dignity for all people leading to quality care attainment of national primary health commitments.

12.2. Objective

i. To prioritize WASH resource allocation for efficient planning and implementation of WASH in HCFs.

This chapter presents WASH in HCF planning, budgeting, procurement and WASH management skills building for the health care workers. It stipulates the bottom up inclusive planning process, prioritization of financing through a cyclic budgeting process, and procurement guidelines and WASH health care worker (education and training).

12.3. Planning

WASH for Health care services and operations at the various facilities should be organized and planned. Planning defines the strategy for the implementation of various health services and operations and, allocation of roles, responsibilities and resources.

Planning for WASH facilities in HCFs involves all organizations listed in Table 2-1 above with their respective roles and responsibilities starting with the In-charge officer and the respective Health Unit / Hospital Management committee.

Where in-house capabilities are insufficient, technical and / or specialized planning requirements / activities for WASH facilities involving capital development or rehabilitation works shall be outsourced and carried out in accordance with the PPDA regulations and guidelines.

The annual budget for WASH requirements for respective HCF is to be prepared by the HCF section in charges. These will submit their plans to the facility in charge for presentation to the HCF management committee. The HCF committee will review plans and budgets after which the facility in-charge will forward to the District Health Officer (DHO). The DHO shall receive and review and forward the reviewed plans and budgets to the extended District Health Management Team (DHMT) for final review and approval. This planning process will follow the July-June government planning cycle.

12.4. Budgeting

The budget will particularly be drawn from the PHC non-wage recurrent (NWR) budget targeting a 10% minimum contribution for new WASH installations and WASH O&M. The approved budget shall be submitted to the procurement unit to be incorporated in the annual procurement plan.

12.5. Procurement

Procurement of the WASH requirements shall be in accordance with the prevailing PPDA regulations.

12.6. Training of Health Workers in HCF WASH Management

The annual HCF WASH budgets will make provisions for in service orientation of health care workers in WASH planning, budgeting and monitoring. The sector lead (MoH) shall engage the professional councils to enhance pre-service WASH in HCF management education.

12.7. Monitoring of Implementation of HCF WASH Plans

Implementation of the HCF WASH plans will be monitored and reviewed on monthly basis by the HCF section heads, and the HCF management committee on a quarterly basis.

12.8. National level monitoring

Monitoring at national level is aimed at measuring the extent to which the set WASH standards in HCFs are adhered to and identify areas for remedial actions. Through the process of monitoring key stakeholders at national level will be informed of the WASH status and actions needed for improvement. The health inspectorate will periodically track progress, and inform management decisions. The tracking will be based on the prevailing District Health Information Software (DHIS 2) or any other software as may be duly approved. HCF data will be routinely collected using the stipulated tools and entered in DHIS 2 to track progress towards national and global targets. Core indicators within DHIS2 shall capture the set national monitoring elements set in these guidelines.

Specific Monitoring /follow up tasks include:

i) Through DHIS2, store national WASH in HCFs performance data from different DLGs;
ii) Provide technical advice and support DLGs on monitoring and follow up process of WASH in HCFs;
iii) Review and provide feedback on monitoring reports from DLGs;
iv) Undertake WASH in HCFs support supervision visits to DLGs; and
v) Organize national/regional stakeholder WASH in HCFs review meetings.

CHAPTER 13: **MONITORING, EVALUATION AND REPORTING**

13.1. Introduction

The primary objective of monitoring WASH services in HCFs is to measure the extent to which these guidelines are implemented and identify areas for immediate improvement. Through the process of monitoring, key stakeholders at different levels, District, regional and national levels will be informed of the WASH status and actions needed for improvement. The indicators provided here build on build upon existing Joint Monitoring Programme (JMP) indicators for monitoring WASH in health care facilities (general service areas) and WHO's Essential Environmental Health Standards in Health Care (2008). They are aligned with the WHO Guidelines on core components of IPC programmes at the national and acute health care facility level (2016), the Infection Prevention and Control Assessment Framework at the Facility Level (IPCAF). The core indicators define "basic" service levels for water, sanitation, hygiene, health care waste management and environmental cleaning in health care facilities. These indicators do not fully capture the ideal service levels, but represent an approximation of the normative ideal which can be readily measured.

13.2. Objective

- At least 50% of all health care facilities in each District have basic WASH services by 2022, and 80% by 2025, with the ultimate aim of 100% by 2030;
- By 2030, higher levels of WASH services are achieved universally in 80% of Districts where universal basic WASH services have been achieved already.

This chapter covers the rationale and guidance for conducting monitoring. It provides a specific set of indicators and questions to monitor implementation of WASH interventions in health care facilities. In addition, the chapter provides examples of tools that can be used for collecting data during monitoring activities at different level of the health care facilities. It also sets out timeline for data collection and indicates responsible persons as well as steps for data quality management, reporting and development of monitoring plan.

13.3. Rationale and Approach for Monitoring of WASH Services in HCFs

National Monitoring of WASH in HCF shall be accomplished two ways:

- Facility Assessments
- Routine Reporting Systems

These guidelines focus on both the facility assessments and the routine reporting systems. The provided indicators herein for routine national monitoring have integrated JMP indicators. Further integration can be incorporated in to existing reporting systems such as:

- Health Information Monitoring Systems (HMIS)
- Emergency Obstetric and Newborn Care (EmONC)
- District Health Information Systems 2 (DHS2)
- IPC Assessment Framework - pairs with national monitoring

The provided indicators also include those that can be used to measure WASH in HCF service consistency, safety, functionality and sustainability.

The monitoring of WASH in HCF in these guidelines mainly focus on:

- Measuring the level of adherence by the HCFs in maintaining the minimum standards of WASH services as prescribed in these guidelines;
- Identifying any shortfalls in the O&M of WASH facilities;
- Alerting actors at different levels of the needed remedial actions either in the design or construction of the WASH facilities.

13.4. WASH Services and Facilities to Monitor

Monitoring of WASH in HCFs will be on a regular and continuing basis primarily aimed at providing the HCF management teams and other stakeholders with information on the provision of minimum standards of WASH services. Several indicators have been developed to guide the monitors on what they should look for during the process. Indicators have been developed around the key aspects of WASH namely, water availability and accessibility, adequate accessibility of sanitation and hygiene facilities as well as vector/vermin control systems in HCFs among others.

13.5. Who and When to Monitor

The sector leads are responsible for monitoring and following up on implementation and progress as well as status of WASH services in all HCFs in the country. However, to improve facility ownership of the WASH monitoring process and results, a bottom-up participatory approach will be adopted commencing at community HCFs to District, regional and eventually national level. WASH monitoring will therefore be undertaken at five levels namely, HCF, District, and national

level. In this way monitoring teams will be structured in a cascading manner from the HCF to the national level.

Thus, the process will require different actors as presented in Table 13-1.

Table 13.1: Roles of the various Actors in Monitoring WASH Services

Actor	Roles
In charge of HCF	• Establish in-house routine monitoring and follow up of WASH services within HCF and implementation of remedial actions e.g. repairs and maintenance of WASH facilities • Coordinate the monitoring process in HCFs within the ward
Designated health care staff and estate manager	• Carry out periodic monitoring of the WASH services in HCFs within the ward
Health facility management team	• Coordinate monitoring process within HCFs • Fund approval and allocation of non-professional operations
Community Health Workers (CHWs)	• Collect data using the provided tools • Provision of health education during home visits regarding • Submission of collected data to WEHO for validation
Health Care Facility Management Committees (HFMCs)	• Provide oversight on the monitoring process of WASH in HCFs
Sector lead	• Design, refine and review national monitoring framework for WASH in HCFs • Define monitoring indicators and standards of WASH in HCFs • Manage the national WASH in HCFs performance data • Provide technical advice to DLGs and on monitoring and follow up process of WASH in HCFs • Review monitoring reports from DLGs • Undertake periodic visits for quality assurance of monitoring process • Organize national review meetings for key stakeholders • Compile/aggregate data on national level WASH status in HCFs

13.6. WASH in Health Care Facility Indicators

13.6.1. Basic Water Services

Definition: Proportion of health care facilities where the main source of water is an improved source, located on the health care premises, from which water is available.

Element	Monitoring definition
Improved	Improved water sources are those which, by nature of their design and construction, have the potential to deliver safe water. Improved sources include: piped water, boreholes or, protected dug wells, protected springs, rainwater, and packaged or delivered water. Unimproved sources include unprotected dug wells or springs and surface water (e.g. lake, river, stream, pond, canals, irrigation ditches).
On premises	Water is accessed within buildings, or within the health facility grounds.
Available	Water from the main water source is available on the day of the survey or questionnaire.

13.6.2. Basic Sanitation Services

Definition: Proportion of health care facilities with improved and usable sanitation facilities, with at least one toilet dedicated for staff, at least one sex-separated toilet with menstrual hygiene facilities, and at least one toilet accessible for users with limited mobility.

Element	Monitoring definition
Improved	Improved sanitation facilities are those designed to hygienically separate excreta from human contact. Improved sanitation facilities are those designed to hygienically separate excreta from human contact. Improved facilities include: flush/pour flush to piped sewer system, septic tanks or pit latrines; ventilated improved pit latrines, composting toilets or pit latrines with slabs. Unimproved facilities include pit latrines without a slab or platform, hanging latrines, and bucket latrines. For the purpose of this document "toilets" is taken to mean any of these improved facilities.
Usable	Toilets are available, functional, and private: • Available to patients and staff (toilets are on premises; doors are unlocked or a key is available at all times) • Functional (the toilet is not broken, the toilet hole is not blocked, there should be no cracks or leaks in the toilet structure and water is available for flush/ pour-flush toilets), and • Private (there are closable doors that can be locked from the inside and no large gaps or holes in the structure) on the day of the survey or questionnaire.

Element	Monitoring definition
Dedicated for staff	There are separate toilet facilities dedicated for patient and staff use.
Sex-separated with menstrual hygiene facilities	At least one toilet is separated for use by women/girls, and has a bin with a lid on it and/or water and soap available in a private space for washing.
Accessible for users with limited mobility	Toilets are considered accessible if they meet relevant national or local standards. In the absence of such standards, toilets should be accessible without stairs or steps, have handrails for support attached either to the floor or sidewalls, a door which is at least 80 cm wide, and the door handle and seat within reach of people using wheelchairs or crutches/sticks.22

13.6.3. Basic hygiene Services

Definition: Proportion of health care facilities with functional hand hygiene facilities available at one or more points of care and within 5 metres of toilets.

Element	Monitoring definition
Hand hygiene facilities	A hand hygiene facility is any device that enables staff and patients to clean their hands effectively, such as a sink with tap, water tank with tap, bucket with tap or other similar device. Alcohol based hand rub dispensers are also hand hygiene facilities, whether they are fixed or portable.
Functional	To be considered functional, hand hygiene facilities at points of care must have either alcohol-based hand rub, or soap and water. If alcohol-based hand rub is used, health care staff may carry a dispenser around between points of care. To be considered functional, hand hygiene facilities at toilets must have soap and water available within 5 m of toilets. Alcohol-based rub is not considered adequate for hand hygiene at toilet as it does not remove faecal matter from hands. Chlorinated water (a prepared solution of chlorine suspended in water) is not considered an adequate substitute for soap and water, or for alcohol-based hand rub.
Points of care	Points of care are any location in the health care facility where care or treatment is delivered (e.g. consultation/exam rooms).
Within 5m of toilets	Hand hygiene facilities at toilets must be located no more than 5metres from the toilets.

22 Jones, H. Mainstreaming disability and ageing in water, sanitation and hygiene programs. WaterAid and WEDC, 2013.

13.6.4. Basic health care waste management services

Definition: Proportion of health care facilities where waste is safely segregated in consultation areas and sharps and infectious wastes are treated and disposed of safely.

Element	Monitoring definition
Safely segregated in consultation area	At least three clearly labelled or colour coded bins should be in place to separate (1) sharps waste[23], (2) infectious waste[24], and (3) non-infectious general waste. Bins should be no more than three quarters (75%) full, and each bin should not contain waste other than that corresponding to its label. Bins should be appropriate to the type of waste they are to contain; sharps containers should be puncture-proof and others should be leak-proof. Bins for sharps waste and infectious waste should have lids. Consultation areas are rooms or areas within the health care facility where care or treatment is delivered.
treated and disposed of safely	Safe treatment and disposal methods include incineration, autoclaving, and burial in a lined, protected pit. Wastes may also be collected and transported off-site for medical waste treatment and disposal.

13.6.5. Basic environmental cleaning practices

Definition: Proportion of health care facilities which have protocols for cleaning, and staff with cleaning responsibilities have all received training on cleaning procedures.

Element	Monitoring definition
Protocols for cleaning	Protocols should include: • Step-by-step techniques for specific tasks, such as cleaning a floor, cleaning a sink, cleaning a spillage of blood or body fluids • A cleaning roster or schedule specifying the frequency at which cleaning tasks should be performed.
Staff with cleaning responsibilities	Includes non-health care providers, such as cleaners, whose tasks include cleaning, as well as health care providers who, in addition to their clinical and patient care duties, are responsible for cleaning.
Training	Training refers to structured training plans or programs led by a trainer or appropriately qualified supervisor.

23 Used or unused sharps, e.g. hypodermic, intravenous or other needles; auto-disable syringes; syringes with attached needles; infusion sets; scalpels; pipettes; knives; blades; broken glass.

24 Waste known or suspected to contain pathogens and pose a risk of disease transmission, e.g. waste and waste water contaminated with blood and other body fluids, including highly infectious waste such as laboratory cultures and microbiological stocks; and waste including excreta and other materials that have been in contact with patients infected with highly infectious diseases in isolation

13.7. Questions for health care facility surveys

The following core questions should be considered for use in any survey or WASH at HCF survey or other data collection tool. Efforts should be made to use these questions or all questions for a particular indicator to ensure that we are able to report on any of the basic service levels for WASH in HCF. Questions are presented in a format for enumerator- collected surveys, but in some cases, different options may be necessary for enumerator surveys and for administrative questionnaires. In such cases, an alternative question is provided to offer flexibility based on survey type and capacities. The core questions are presented in five sections: questions related to (1) water, (2) sanitation, (3) hygiene, (4) health care waste management and (5) environmental cleaning.

13.7.1. Core Water Questions

Effective functioning of a health care facility, and the ability to prevent the spread of infections, relies on a safe, sufficient and reliable supply of water on premises.

Question Qn1a aims to determine the type of the facility's main source of water for general purposes, including drinking, washing, hygiene, environmental cleaning and laundry. It does not cover water for medical purposes, such as dialysis. Where water is available from multiple sources, the main source should be recorded. The recommended categories are based on JMP definitions of "improved" and "unimproved" water sources.

Qn 1a. What is the main water supply for the facility? (Tick one)	
Piped supply inside the building	
Piped supply outside the building	
Borehole	
Protected well	
Unprotected well	
Protected spring	
Unprotected spring	
Rain water	
Tanker truck	
Surface water (river/dam/lake/pond)	
Other (specify) _____	
Don't know	
No water source	

Note

If there is more than one source, the one used most frequently should be selected. If patients need to bring water from home because water is not available at the facility, "no water source" should be selected.

Question 1b asks about location of the water supply, in recognition of the fact that health care facilities need large volumes of water (for example 100 L of water per delivery and 40-60 L per inpatient per day) and therefore should have a water supply located on premises to be able to meet the demands of the facility.

Question 1b asks about location of the water supply, in recognition of the fact that health care facilities need large volumes of water (for example 100 L of water per delivery and 40-60 L per inpatient per day) and therefore should have a water supply located on premises to be able to meet the demands of the facility.

Qn 1b. Where is the main water supply for the facility located?	
On premises	
Up to 500 m	
500 m or further	

Note

On premises means within the building or facility grounds.

This question refers to the location from where the water is accessed for use in the health facility (e.g. tap, borehole), rather than the source where it originates.

Question 1c asks about the availability of water on the day of the survey or questionnaire, rather than asking respondents to generalise about availability of water over time, to limit response bias.

Q1c. Is water available from the main water supply at the time of the survey?	
Yes	
No	

Note

To be considered available, water should be available at the facility at the time of the survey or questionnaire. Where possible, the enumerator should confirm that water is available from this source, e.g. check that taps or hand pumps deliver water.

13.7.2. Core Sanitation Questions

Question 2a Sanitation in health care facilities should ensure the hygienic separation of excreta from human contact. Sanitation is also important for dignity and human rights and has an important gender element, as toilets should ensure privacy and safety for the needs of women and girls.

Q 2a. What type of toilets/latrines are at the facility for patients?	
Flush / Pour-flush toilet to sewer connection	
Flush / Pour-flush toilet to tank or pit	
Pit latrine with slab	
Composting toilet	
Flush / Pour-flush toilet to open drain	
Pit latrine without slab/open pit	
Bucket	
Hanging toilet/latrine	
No toilet/latrine (skip to G-H1)	
Other (specify) _____	

Note

If more than one type of toilet is used, the most common type of toilet/latrine in the service area should be selected.

Question 2b Sanitation questions aim at establishing the availability of usable, improved toilets for patients and staff in a given service area to provide a general assessment of how well sanitation facilities support hygienic separation of human waste from user contact and uphold patient and staff rights, dignity and comfort. Certain sanitation technologies are more likely than others to hygienically separate human excreta from human contact.

These are categorized by the JMP as "improved" sanitation facilities, while others are labelled as "unimproved," following the same definitions and categories used for household-level monitoring.

These questions ask about the type (to assess whether improved or unimproved) and usability of toilets on premises.

Q2b. Is at least one toilet usable (available, functional, private)?	
Yes	
No	

Note

To be considered usable, a toilet should be available, functional and private at the time of the survey or questionnaire.

Toilets are available when on premises, doors are unlocked or with a key available at all times. To be functional, the hole or pit is not blocked, water is available for flush/pour flush toilets, and there are no cracks or leaks in the toilet structure. To be considered private, the toilet stall has doors that can be locked from the inside and there are no large gaps or holes in the structure. If any of these criteria are not met, the toilet/latrine is not counted as usable

Q. 2c. Are there toilets that …	Yes	No
a. Are dedicated for staff?		
b. Are in sex-separated or gender-neutral rooms?		
c. Have menstrual hygiene facilities?		
d. Are accessible for people with limited mobility?		

Notes

a. Staff toilets should be for the exclusive use of staff.

b. Toilets can be in a room with multiple stalls or in a private room with a single toilet. Toilets in rooms with multiple stalls should all be dedicated for use by either women or men. A gender-neutral room with a single toilet is also considered as sex-separated, as it allows women and men to use toilets separately.

c. A toilet can be considered to have menstrual hygiene facilities if it:

- *has a bin with a lid on it for disposal of used menstrual hygiene products, and*
- *Water and soap available in a private space for washing.*

d. A toilet can be considered accessible for people with limited mobility if it meets relevant national or local standards. In the absence of such standards, it should meet the following conditions:

- *Can be accessed without stairs or steps,*
- *Handrails for support are attached either to the floor or sidewalls,*
- *The door is at least 80 cm wide, and*
- *The door handle and seat are within reach of people using wheelchairs or crutches/sticks.*

These questions aim to understand more details about those toilets.

Firstly, solicits information about staff-dedicated toilets (regardless of whether they are sex-separated) which is important in health care facilities to reduce risk of infections, particularly in outbreak situations.

Understand if toilets are sex- separated such that there is at least one usable toilet available for women and girls. The toilet for women and girls should also provide facilities for managing menstrual hygiene needs.

Finally, question G-S6 captures whether any of the toilets are suitable for users with limited mobility. This toilet(s) must be accessible to patients and does not need to be sex-specific as facilities may have one gender- neutral toilet for users with limited mobility.

The minimum number of toilets required to meet the criteria for a basic sanitation service is one toilet dedicated for staff and one gender-neutral toilet for patients that has menstrual hygiene facilities and is accessible for people with limited mobility.

13.7.3. Core Hygiene Questions

Hand hygiene is an important aspect of infection prevention and control in HCF, both at points of care and at toilets.

Question 3a asks about the availability of functional hand hygiene facilities at points of care, which are important to deliver safe care and reduce infections. Hand hygiene facilities may consist of either soap and water or alcohol- based hand sanitizer ABHR (which health care workers, patients, visitors and care giver may have).

3a. Is there a functional hand hygiene facility at points of care on the day of the survey?	
Yes	
No, there are hand hygiene facilities at points of care but not functional, or lacking soap and water or alcohol-based hand rub.	
No, no hand hygiene facilities at points of care	
No, no hand hygiene facilities at the health care facility (if yes, skip to G-C1)	

Note

For facilities with multiple consultation rooms or areas, select one at random and observe if a functional hand hygiene facility is present. A functional hand hygiene facility is any device that enables staff, patients and visitors to clean their hands effectively. It may consist of soap and water with a basin/pan for washing hands, or alcohol-based hand rub (ABHR). If ABHR is used, health care staff may carry a dispenser around between points of care. Chlorinated water (a prepared solution of chlorine suspended in water) is not considered an adequate substitute for soap and water or for ABHR.

Points of care are any location in the health care facility where care or treatment is delivered (e.g. consultation/ exam rooms).

The term "hand hygiene" is used in place of "handwashing", because this is an umbrella term that also includes cleaning hands with ABHR.

Question 3b asks about hand washing facilities at toilets, another critical moment for hand hygiene. The term hand washing is used as ABHR is not an effective solution for hand hygiene at toilets because it does not remove fecal matter.

More information can be found on the requirements for hand hygiene in the WHO Guidelines on Hand Hygiene in Health Care.[25]

3b. Is there a functional hand washing facility at one or more toilets on the day of the survey?	
Yes	
No, there are hand washing facilities near the toilets but lacking soap and/or water	

25 WHO Guidelines on Hand Hygiene in Health Care. World Health Organization, Geneva, 2009. http://www.who.int/gpsc/5may/tools/9789241597906/en/

No, no hand washing facilities near toilets (within 5 meters)	

Note

Hand washing facilities at toilets must include water and soap, rather than ABHR alone, since ABHR does not remove fecal matter.

Check "yes" if at least one toilet has a hand washing facility with soap and water within 5 meters.

13.7.4. Core Health Care Waste Management Questions

Waste produced from health care activities, from contaminated needles to radioactive isotopes, can cause infection and injury, and inadequate management is likely to have serious public health consequences and deleterious effects on the environment. Safe health care waste management involves multiple steps from segregation to transport, treatment and final disposal. Questions 4a-c seek to distil this process into a small number of measurable elements.

4a. Is waste correctly segregated into at least three labelled bins in the consultation area?	
Yes, waste is segregated into three labelled bins	
No, bins are present but do not meet all requirements or waste is not correctly segregated	
No, bins are not present	

Note

For facilities with multiple consultation rooms, select one at random and observe whether sharps waste, infectious waste and non-infectious general waste are segregated into three different bins.

The bins should be color-coded and/or clearly labelled, no more than three quarters (75%) full, and each bin should not contain waste other than that corresponding to its label. Bins should be appropriate to the type of waste they are to contain; sharps containers should be puncture-proof and others should be leak-proof. Bins for sharps waste and infectious waste should have lids.

4b. How does this facility usually treat/? dispose of sharps waste?	
Autoclaved	
Incinerated (two chamber, 850-1000 °C incinerator)	
Incinerated (other)	
Burning in a protected pit	
Not treated, but buried in lined, protected pit	

Not treated, but collected for medical waste disposal off-site	
Open dumping without treatment	
Open burning	
Not treated and added to general waste	
Other (specify)	

Note

If more than one applies, select the method used most often. Methods considered to meet the basic service level include autoclaving; incineration; burial in a lined, protected pit; and collection for medical waste disposal off-site.

4c. How does this facility usually treat/ dispose of infectious waste?	
Autoclaved	
Incinerated (two chamber, 850-1000 °C incinerator)	
Incinerated (other)	
Burning in a protected pit	
Not treated, but buried in lined, protected pit	
Not treated, but collected for medical waste disposal off-site	
Open dumping without treatment	
Open burning	
Not treated and added to general waste	
Other (specify)	

Note

If more than one applies, select the method used most often.

Methods considered to meet the basic service level include autoclaving; incineration; burial in a lined, protected pit; and collection for medical waste disposal off-site.

13.7.5. Core Environmental Cleaning Questions

Environmental cleaning (herein referred to as cleaning) is an essential part of infection prevention and control. Trying to assess whether a service area is considered "clean" is very subjective, and visibly clean may be very different from microbiologically clean. Similarly, frequency of cleaning is difficult to measure because it cannot be observed by enumerators in one day and responses are likely to be subject to respondent bias. How frequently a facility needs to be cleaned is linked to patient load, therefore cleaning schedules varies greatly from facility to facility.

Question 5a asks about the existence of protocols for cleaning which serves as an indication of the importance a HCF places on environmental hygiene. Protocols may or may not be written given cleaners.

5a. Are cleaning protocols available?	
Yes	
No	

Note

Protocols should include:

- *Step-by-step techniques for specific tasks, such as cleaning a floor, cleaning a sink, cleaning a spillage of blood or body fluids, and*
- *A cleaning roster or schedule specifying responsibility for cleaning tasks and frequency at which they should be performed.*

The term for protocols may differ according to local practice; they may be referred to as Standard Operating Procedures (SOPs), guidelines, instructions, etc.

Where possible, protocols should be observed by the enumerator.

Question 5b asks whether staff with responsibility for cleaning (either dedicated cleaners or multi-tasking) and whether they have been trained.

5b. Have all staff responsible for cleaning received training?	
Yes, all have been trained	
No, some but not all have been trained	
No, none have been trained	
No, there are no staff responsible for cleaning	

Note

"Staff responsible for cleaning" refers to non-health care providers such as cleaners, orderlies or auxiliary staff, as well as health care providers who, in addition to their clinical and patient care duties, perform cleaning tasks as part of their role.

Training refers to structured training plans or programs led by a trainer or appropriately qualified supervisor.

Questions 6a asks about the cleaning protocols and schedules and whether they are being routinely used in cleaning.

6a. Are all cleaning protocols and schedules available?				
Responses		Available		
	Protocol for cleaning a floor	Yes, observed	Yes, reported (not observed)	No
	Protocol for cleaning a sink	Yes, observed	Yes, reported (not observed)	No
	Protocol for cleaning a spillage of blood or bodily fluids	Yes, observed	Yes, reported (not observed)	No
	Cleaning roster or schedule	Yes, observed	Yes, reported (not observed)	No
Note: *Protocols may be applicable to the whole health facility and will not necessarily be specific to a given service area.*				

13.8. Topics for Additional Monitoring

Water

- Water quantity: sufficiency for all purposes (drinking, food preparation, personal hygiene medical activities, cleaning and laundry), sufficiency throughout the day and seasonally.
- Water access: water collection points and water-use facilities for convenient access and use of water; ratio of hand washing stations to patients; availability of sex-separated showers; inpatient laundry facilities.
- Drinking water: quality (E. coli, total coliforms, residual chlorine, arsenic, fluoride); availability (for staff/patients/visitors, in specific service areas); accessibility of drinking water points for people with limited mobility and children.
- Water for cooking, personal hygiene, medical activities, cleaning and laundry: quality (E. coli, total coliforms, residual chlorine, arsenic); onsite water treatment; water for medical purposes; water sources for different purposes (including clear labelling).
- Cleaning and laundry, sufficiency throughout the day and seasonally.
- Availability of sex-separated showers; inpatient laundry facilities.
- Consistency of water availability
- Functionality of water infrastructure
- Water storage capacity
- Quality of available toilets
- Accessibility of toilets (functionality, locked/unlocked, etc.)

- Facility Management of WASH (personnel, policies, procedures, support)
- Water Quality*

Sanitation

- *Toilets:* ratio of toilets to patients; cleanliness; lighting (day/night); distance of toilets from consultation area; cultural appropriateness; availability of cleansing materials; children-appropriate toilets; vector control measures in toilets; same-floor access to toilets.
- *Open defecation:* evidence in facility grounds.
- *Excreta treatment and disposal:* management of faeces.
- *Wastewater:* removal; rainwater and surface run-off;
- Drainage; treatment.
- *Flooding:* within facility grounds, blocked/flooded toilets

Hand hygiene and hygiene promotion

- *Hygiene promotion:* availability of hygiene promotion materials at hand hygiene facilities; hygiene promotion activities, infection prevention and control training.

Cleaning

- *Environmental cleaning:* daily cleaning of floors, surfaces, toilets; availability of cleaning materials and products; budget allocation and expenditure on cleaning materials; visible cleanliness of specific service areas; disinfection; staff knowledge of protocols; implementation of protocols.
- *Cleaning materials:* availability and sufficiency;
- Mechanisms to track out of stock materials.
- And storage of soiled linen; disinfection of beds; frequency of changing soiled linen.

Health care waste management

- *General waste:* treatment and disposal.
- *Sharps:* availability of needle or hub cutters.
- *Bins:* location (out of reach from children etc.); ratio of waste containers to beds.
- *Waste collection/transportation:* frequency of waste collection s for transportation.
- *Storage:* storage time, fenced storage areas.
- *Waste disposal:* fenced disposal area; disposal of chemical and radioactive waste.
- *Off-site waste treatment*

Others

- ***Energy (for water pumps, heaters, medical equipment):*** availability, sufficiency, reliability; backup energy source.
- Food handling and preparation.
- ***Building design, construction and management:*** ventilation and airflow, heating and air-conditioning, minimization of infectious disease transmission, minimization of patient flow, space, building design.
- ***Toilets:*** ratio of toilets to patients; cleanliness; lighting (day/night); distance of toilets from consultation area; cultural appropriateness; availability of cleansing materials; children-appropriate toilets; vector control measures in toilets; same-floor access to toilets.
- ***Open defecation:*** evidence in facility grounds.
- ***Excreta treatment and disposal:*** management of feces.
- ***Wastewater:*** removal; rainwater and surface run-off; drainage; treatment.
- ***Flooding:*** within facility grounds, blocked/flooded toilets.
- Hand hygiene and hygiene promotion.
- ***Hygiene promotion:*** availability of hygiene promotion materials at hand hygiene facilities; hygiene promotion activities, infection prevention and control training.
- Cleaning
- ***Environmental cleaning:*** daily cleaning of floors, surfaces, toilets; availability of cleaning materials and products; budget allocation and expenditure on cleaning materials; visible cleanliness of specific service areas; disinfection; staff knowledge of protocols; implementation of protocols.
- ***Cleaning materials:*** availability and sufficiency;
- Mechanisms to track out of stock materials.
- And storage of soiled linen; disinfection of beds; frequency of changing soiled linen.
- Health care waste management General waste: treatment and disposal. Sharps: availability of needle or hub cutters.
- ***Bins:*** location (out of reach from children etc.); ratio of waste containers to beds.
- Waste collection / transportation: frequency of waste collection s for transportation.
- Storage: storage time, fenced storage areas.
- Waste disposal: fenced disposal area; disposal of chemical and radioactive waste.
- Off-site waste treatment.

13.9. Evaluation and measuring Outcomes

- **Basic coverage and use evaluations** (baseline, endline): *What proportion of the HCF had basic water services? What proportion of functional toilets were accessible to patients during a normal operating day? What portion of HCF had climate resilient services?*
- **Process and sustainability evaluations**: *Was your project fully implemented according to plans (process)? Did the water treatment systems supply safe water for greater than 80% of a normal operating day for the past year? (sustainability)*
- **Improvements over time based on indicators** (baseline, midline, end line)

13.10. Other possibilities for outcome measures

- Behavioral Outcomes: Change in hand hygiene behavior of healthcare workers at 5 key moments of handwashing (pre/post intervention).
- Service Outcomes: Change in satisfaction surveys and/or tracking patient flow or deliveries (pre/post intervention), etc.
- Health Outcomes: Change in healthcare associated infections with improved WASH services (*assumes existing surveillance or plans to monitor HCAIs).
- Design Outcomes: New facilities are constructed with appropriate WASH services and maintenance systems are in place.
- Climate Resilience Outcomes: Resilient water and sanitation services and hygiene behaviors.

13.11. Sharing Learnings

- Monitoring and evaluation data in real time (Continuous Quality Improvement)
- Case studies and practical experiences
- Program Lessons Learned - open conversation about challenges and failures
- Best Practices for technical audiences
- Costing information (*serious gap in WASH in HCF literature)
- Approach to sustainability

13.12. Reporting

Reporting of progress in the implementation of WASH in HCFs should be done monthly by the section heads to the health facility in charges. The in HCF in charges shall report to the health facility management committee in a quarterly basis.

13.13. Data Collection Tools and Sources

Facility assessment surveys, supported by international organizations, are likely to be the main source of data for WASH in HCF, followed by national Health Management Information Systems (HMIS). The most common health care facility surveys are the Service Availability and Readiness Assessment (SARA)[26], the Service Delivery Indicators survey (SDI)[27], the Service Provision Assessment (SPA)[28], Preventing Monitoring and Accountability 2020 (PMA 2020)[29] and the Emergency Obstetric and Newborn Care assessment (EmONC)[30]. These surveys and assessments have closely aligned methods and collect nationally representative data for Uganda. They are designed to be conducted periodically and may consist of either a census of all health care facilities, or a random sample from a master list of all health care facilities.

13.14. Data Analysis and Reporting

The figure below is an example of core questions presented in an alternative matrix style question, for use in a SARA survey.

26 Service Availability and Readiness Assessment (SARA) Reference Manual, WHO, 2013.
27 Service Delivery Indicators Education and Health Waly Wane and Gayle H.Martin, 2013
28 Service Provision Assessment Survey. MOH and Macro International Inc. Calverton, Mary Land, USA, 2008
29 Performance Monitoring and Accountability 2020. John Hopkins- Bloomber school of Public Health, 2015
30 Monitoring and evaluation toolkit for the scale-up of emergency obstetric and newborn care in Kenya, 2017

Proportion of facilities with basic water, sanitation, hygiene, health care waste management, and environmental cleaning services								
Proportion of health care facilities…			**SURVEY NAME, YEAR (note if data were observed or reported)**					
		National	Urban	Rural	Hospital	Non-Hospital	Government	Non-Government
Water	with an improved water supply located within 500 meters							
	with an improved water supply on premises							
	with an improved water supply with water available							
	with water available from an improved water supply located on premises*							
Sanitation	with improved toilets							
	with improved toilets which are usable							
	with improved toilets which are dedicated for staff							
	with improved toilets which are sex- separated							
	with improved toilets with facilities for menstrual hygiene management							
	with improved toilets which are accessible for people with limited mobility							
	with improved toilets which are usable, sex-separated, provide for menstrual hygiene management, separate for patients and staff, and accessible for people with limited mobility*							

Hygiene	with hand hygiene facilities at point of care with water and soap and/or alcohol hand rub available							
	with handwashing facilities within 5 meters of toilets with water and soap available							
	with hand hygiene facilities at point of care with water and soap and/ or alcohol hand rub available and handwashing facilities within 5 meters of the toilets with water and soap available*							
Health Care Waste Management	with waste correctly segregated in the consultation area							
	with infectious waste safely treated/ disposed							
	with sharps waste safely treated/ disposed							
	with waste correctly segregated in the consultation area and infectious and sharps waste safely treated/ disposed*							
Environmental	with cleaning protocols available							
	where all staff responsible for cleaning have received training							
	with cleaning protocols available and where all staff responsible for cleaning have received training*							

**SDG indicator for "basic" service*

1. **Main water source (select one):** Piped Tube well/Borehole Protected dug well Unprotected dug well Protected spring Unprotected spring Rain water Tanker truck Surface water (River/Lake/Canal) No water source Other:
2. **Main water source is on premises:** Yes Off premises but up to 500 m More than 500 m
3 **Water from main source is currently available:** Yes No
4 **Number of usable (available, functional, private) toilets for health care facility:** (insert number)
5. **Type of toilets/latrines (select one – most common):** Flush/Pour-flush to sewer Flush/Pour-flush to tank or pit Flush/Pour-flush to open drain Pit latrine with slab/covered Pit latrine without slab/open Bucket Hanging toilet/latrine None
6. **Toilets separated for staff and patients:** Yes No
7. **Toilets separated for male and female patients:** Yes No
8. **Female toilets have facilities to manage menstrual hygiene needs (covered bin, and/or water and soap):** Yes No
9. **At least one toilet accessible to people with limited mobility:** Yes No
10. **Soap and water (or alcohol-based hand rub) currently available in consultation rooms:** Yes Partially (e.g. lacking materials) No
11. **Soap and water currently available at toilets:** Yes, within 5 m of toilets Yes, more than 5 m from toilets No, no soap and/or no water
12. **Sharps, infectious and general waste are safely separated into three bins in consultation room:** Yes Somewhat (bins are full, include other waste, or only 1 or 2 available) No
13. **Treatment/disposal of sharps waste:** Autoclave Incinerator (2 chamber, 850-1000°C) Incinerator (other) Burning in protected pit Not treated, but buried in lined, protected pit Not treated, but collected for medical waste disposal Open dumping without treatment Open burning Not treated and added to general waste Other: (specify)
14. **Treatment/disposal of infectious waste:** Autoclave Incinerator (2 chamber, 850-1000 °C) Incinerator (other) Burning in protected pit Not treated, but buried in lined, protected pit Not treated, but collected for medical waste disposal Open dumping without treatment Open burning Not treated and added to general waste Other: (specify)
15. **Protocols for cleaning (floor, sink, spillage of blood or bodily fluid) and cleaning schedule are available:** Yes No
16. **All staff responsible for cleaning have received training:** Yes Not all trained None trained

Example of core questions adapted from national HMIS

CHAPTER 14: **REGULATIONS AND COMPLIANCE**

14.1. Introduction

Many guidelines have evidently been existent but implementation has been a very big challenge. The set of regulations, rules and bye-laws documented below, as provided for by Topic 13 of the National Health Policy 1999, have been formulated to facilitate implementation of the WASH guidelines as intended. They neither replace the legal systems within the country nor the health sector but rather are meant to complement them.

It has criticallly been noted that there is a lacuna in the drafting and implementation of Ugandan Law, however, Ministry of health has been perhaps the most affected because these statutes are not frequently amended. There is a need therefore, to specififcally look at all the pieces of legislation in regards to the technical teams and taskforces to ensure that duplicity of duties is taken care of as it appears frequently in the Public Health Act and PILS. It is recommended that the enacting bodies of these taskforces all be bound into one so that the statutes are uniform, this will reduce on conflicts in regards to Accounting, managing of funds and supervision.

PLEASE NOTE:

As part of Ministry of Health's roles of Capacity building, healthcare facilities assessment as well as regulation of public health standards;

It will be upon the relevant departments to:-

- *Educate and train employees and ensure adequate understanding of the expectations, and setting forth terms in the compliance plans and codes of conduct;*
- *Conduct comprehensive initial compliance training, thereafter an annual review training to highlight any compliance program changes or new developments as well as re-emphasize the practice's codes of conduct;*

- *Make compliance training mandatory for all employees;*
- *Develop, review, and update compliance policies;*
- *Develop effective lines of communication;*
- *Contract educationists to design training programs that aid information retention across all levels of learners (Health workers, patients, carers and communities served);*
- *Develop formal processes for managers to communicate compliance issues to staff;*
- *Ensure communication channels foster dialogue rather than one-way communication;*
- *Create anonymous reporting processes to prevent real or perceived retaliated responses e.g. hotlines, email drop boxes, suggestion boxes etc.*

14.2. Objectives

- For enforcement of compliance with efficient and effective use of water, sanitation facilities and good practices of hygiene at the health care facilities

14.3. Regulations

Effective enforcement for compliance with efficient and effective WASH programmes and facilities entails regulations to the beneficiaries including HCFs staff, patients, care givers, visitors and the neighbouring community. This may require setting of rules with 'dos' and 'don'ts' and bye-laws as necessary with consequences of non-compliance.

14.3.1. Rules

HCFs in conjunction with the Ministry of Health and the local administration may set rules as necessary for guidance in the proper handling and use of the WASH facilities in HCFs.

The rules shall include compliance requirements for the utilization of WASH facilities by patients, care givers, visitors and the HCFs workers.

14.3.2. Bye-Laws and Ordinances

The 1995 Constitution of the Republic of Uganda (as variously amended) is the primary legislation in the country. Article 2 of the said constitution provides for its supremacy. Article 2 - section 2 provides that the constitution is the supreme law of the land and any other law that is inconsistent with any of its provisions, the constitution shall prevail.

As a result of Decentralization, local governments and rulers below them were given powers to create laws to cover gaps that were not catered for by the main laws (Bye-laws).

Bye-laws therefore are Laws set by local Government administrators under the Local Government Act to regulate the implementation and operation of WASH in HCFs in particular. The bye-laws shall be duly approved by the respective government ministries and authorities.

14.4. Topic 13 of the National Health Policy (1999)

Topic 13 of the National Health Policy (1999) provides for the legal aspects of health. Sub-topic 13.1 is to the effect that the policy objective is to review and develop the relevant legal instruments that govern and regulate health and health-related activities in the country in order to ensure that principles and objectives of this policy are attained.

Sub-topic 13.2 provides for the government's mandate to update, formulate and disseminate laws, regulations and enforcement mechanisms related to:

- Development and control of health services;
- Training in conduct of medical and health research;
- Protection of employees against health hazards in liaison with relevant organizations;
- Environmental Health Control in collaboration with relevant organizations among others.

Facing medical councils for legal action helps health care providers to meet their obligations and sends a clear message to staff and public that practice is committed to conducting itself in an ethical manner by promoting good employee conduct and proving quality patient care, disciplinary committees which inquire into and have powers to summon witnesses and culprits , boards concerned, have enforcement mechanisms embedded in the UMDPC, Uganda nurses and midwives councils Act, Uganda Medical Allied Workers Council, which include but are not to limited to disciplinary actions like fines, deregistration, extermination, imprisonment and restoration either after serving the sentence or once wrong is put right.

Whereas this guideline is going to be widely distributed it's possible that processes and procedures for compliance had not been well laid out, and for that matter, before documenting enforcement, compliance mechanisms shall precede.

There will be eleven fundamental elements of an effective compliance program:

- Implementing written policies;
- Conducting sensitization;
- Designating compliance officers and compliance committees to provide program oversight (partly done since IPC committees already exist) Use of due diligence in delegation of authority;
- Educating employees and developing effective lines of communication;
- Holding competitions on identified items;

- Conducting internal monitoring and evaluation;
- Holding observation weeks;
- Offering support for such identified areas of weakness to ensure WASH activities are done (for example if health workers are failing in their duties due to community insubordination, the Local government, community leadership in collaboration with the health teams may work together to sort such a challenge and later task the immediate family, especially children to offer the relevant support);
- Enforcing standards through well publicized disciplinary guidelines;
- Responding promptly to detect the offences and undertaking corrective action.

Basing on the seven fundamental elements above, additional duties and responsibilities of the Ministry of Health, Medical Councils, Health Inspector and the committee have been recommended as detailed below:

Obligation of Medical Councils

- To review disciplinary guidelines at least annually with the respective health workers and information should be readily available to review, so that employees are well aware of their obligations;
- To handle queries and reports of noncompliance with set guidelines and code of conduct.

Additional Qualifications, Roles and Responsibilities of Health Inspectors and WASH / IPC Committees as Compliance Managers:

Qualifications of a Health Inspectorate

- The Health inspectorate should be very familiar with the practices' operational and compliance activities e.g. it should be the midwife to discard the placenta into the placenta pit and not the patients;
- The Health Inspectorate shall be administrative authority in regard to WASH / IPC, without which he will be very ineffective.

VERY IMPORTANT QUOTE:

The Appointing as well as the delegating officers must note that delegative leadership is a type which can easily lead to the lowest productivity among group members, therefore checks and balances are a must for maximum productivity and efficiency.

Health Inspector's Daily Roles will include:

- Administering compliance programs
- Being informed about the outcomes of Monitoring and Evaluation
- Reporting compliance enforcement activities
- Assess/ Review the compliance programs
- Should be available, accessible for routine provision of or referral for appropriate solutions about compliance and Ethics

Additional responsibilities of the WASH /IPC Committee;

- It will be a multidisciplinary Committee which will report through the Health Inspector to either the Director, Medical Superintendent or Hospital Administrator according to the established reporting lines or delegation at the time;
- With the Health Inspector as the lead compliance officer, both the WASH /IPC Committee will jointly watch activities related to WASH.

Joint Roles of the Health Inspector and WASH / IPC Committee will include:

- Attending meetings for operational staff
- Ensure all are familiar with compliance / Ethical issues
- Should keep reminding staff especially those in direct touch with WASH / IPC issues about the importance of timely reporting process of events and the time frame
- Monitoring and Evaluating compliance performance
- Recommending quality improvement
- Enforcing initial disciplinary standards
- Developing and Evaluating the work plans and risk assessment plans
- Continuous Professional development - Implement training programs designed to aid information retention by also making them interactive with actual compliance scenarios that learners and managers may encounter
- Enforcing compliance programs requirements at all levels of the facility
- Should communicate compliance messages via other informal training methods e.g. posters, newsletters, visual screens etc.

Designating compliance Officers and committees to provide oversight

- The Health Inspectors shall be given the mandate to oversee WASH/IPC activities, and shall therefore be the Compliance Officers, (Ref to Bullet 2 below)
- The WASH/IPC committees shall become the Compliance Committees as in the roles and responsibilities under the institutional framework
- There shall be use of due diligence in delegation of activities

- There shall be development of effective lines of communication and training / Education of employees
- There shall be routine internal monitoring and Evaluation
- All enforcement standards shall be through well published disciplinary guidelines
- The Health inspectors in liaison with Facility in- charges and senior management according to the lines of reporting already established, shall promptly respond to detect the offences and undertake corrective action.

14.5. Consequences for non-compliance

Consequences for non-compliances with the set rules are necessary for the regulations to be of the intended effect. Consequences may include warning to first time offenders or penalties involving fines to habitual offenders. Where offences of commission or omission in relation to the implementation and mis-management of WASH programmes and mishandling of WASH facilities in HCFs are determined by the HCF Management Committees, the culprit(s) shall be held liable with consequences and penalties in accordance with the laws of the Republic of Uganda.

Offences of non-compliance with these guidelines may, in case of medical practitioners, be subject to provisions of the National Health Policy (1999).

14.6. Enforcement

Enforcing councils have already been established for legal action as empowered by the Second National Health Policy and with this 'dot.com' era all is readily available.

Therefore, it's up on all literate health workers to access it and update regularly to avoid falling prey.

14.6.1. Enforcing standards

Disciplinary guidelines are well and clearly written, however should include sanctions for failure:

  - To comply with codes of conduct, rules etc.,
  - To detect non-compliance when routine observation or due diligence would have provided notice
- To report actual or suspected non-compliance
- Expectations and consequences of noncompliance are also well described in the code of conduct of the Uganda Medical and Dental Practitioner's Council, Uganda Nurses and Midwives' Act, and The Uganda Medical Allied workers' council's rules. Article 28 provides for the right to a fair hearing which is to the effect that an accused person should be given time and space to defend themselves, Articles 42 and 44 of the

constitution provide for the procedures in which complaints to the council should be handled keeping in mind the fact that the right to a fair hearing is non-derogable.

- The Disciplinary committees should ensure consistent and timely discipline after all investigations confirm violation
- Where the worst comes to the worst, criminal cases may be instituted against the medical practitioners under sections 199,227 and 228 for negligence when treating or carrying out surgeries on a person.

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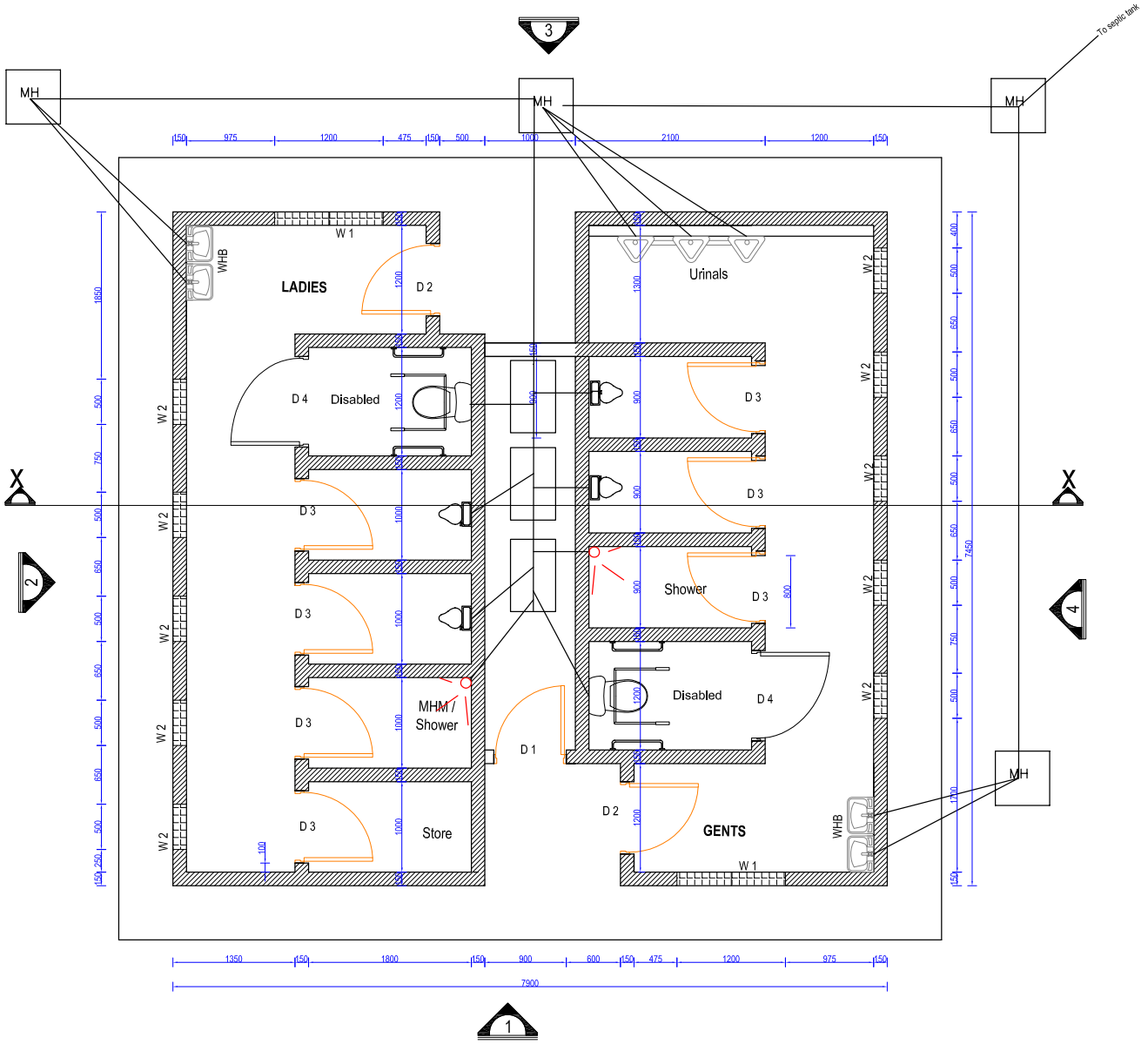
Appendix 1: Typical WASH facilities designs

LIST OF ANNEXES: TYPICAL DESIGNS

DWG NO.	DESCRIPTION
MOH/WASH/WBT/01	Water Borne Toilet - Floor Plan
MOH/WASH/WBT/02	Water Borne Toilet - Section Details
MOH/WASH/WBT/03	Water Borne Toilet - Elevations
MOH/WASH/WBT/04	Water Borne Toilet - Door and Window Schedule
MOH/WASH/ST/01	Septic tank Details
MOH/WASH/SAP/01	Typical Soak Pit Details
MOH/WASH/VIP/01	Lined VIP Latrine Details for Females
MOH/WASH/VIP/01A	Door and Window Schedule for the Females VIP Latrine
MOH/WASH/VIP/02	Lined VIP Latrine Details for Males
MOH/WASH/VIP/02A	Door and Window Schedule for the Males VIP Latrine
MOH/WASH/INC/01	Incinerator Details Constructed from Masonry Brickwork
MOH/WASH/INC/02	Incinerator Details Constructed from Precast Sections
MOH/WASH/PP/01	Placenta Pit Details
MOH/WASH/SWCB/01	Solid Waste Collection Bunker Details
MOH/WASH/BS/01	Bath Shelter - Plan
MOH/WASH/BS/02	Bath Shelter - Section Details

THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: LIST OF ANNEXES	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/DL/01	DATE: JULY. 2021	SHEET 1 OF 1



NOTES

1. All dimensions are in millimetres unless otherwise stated;
2. All levels are in metres unless otherwise stated;
3. Strip footings are mass concrete C20/20
4. Ground slab concrete is reinforced concrete C20/20;
5. Beams are reinforced concrete of sectional size 150mm wide by 200mm deep;
6. Excavation for foundations shall be up to firm ground but not less than 0.6m;
7. Ceiling shall be expanded metal sheet and 1:3 cement-sand mortar mix on 75x50 joists on 50x50mm branderings;
8. Internal walls should be finished with ceramic tiles (1.8m high);
9. Floor should be finished with cermic tiles.

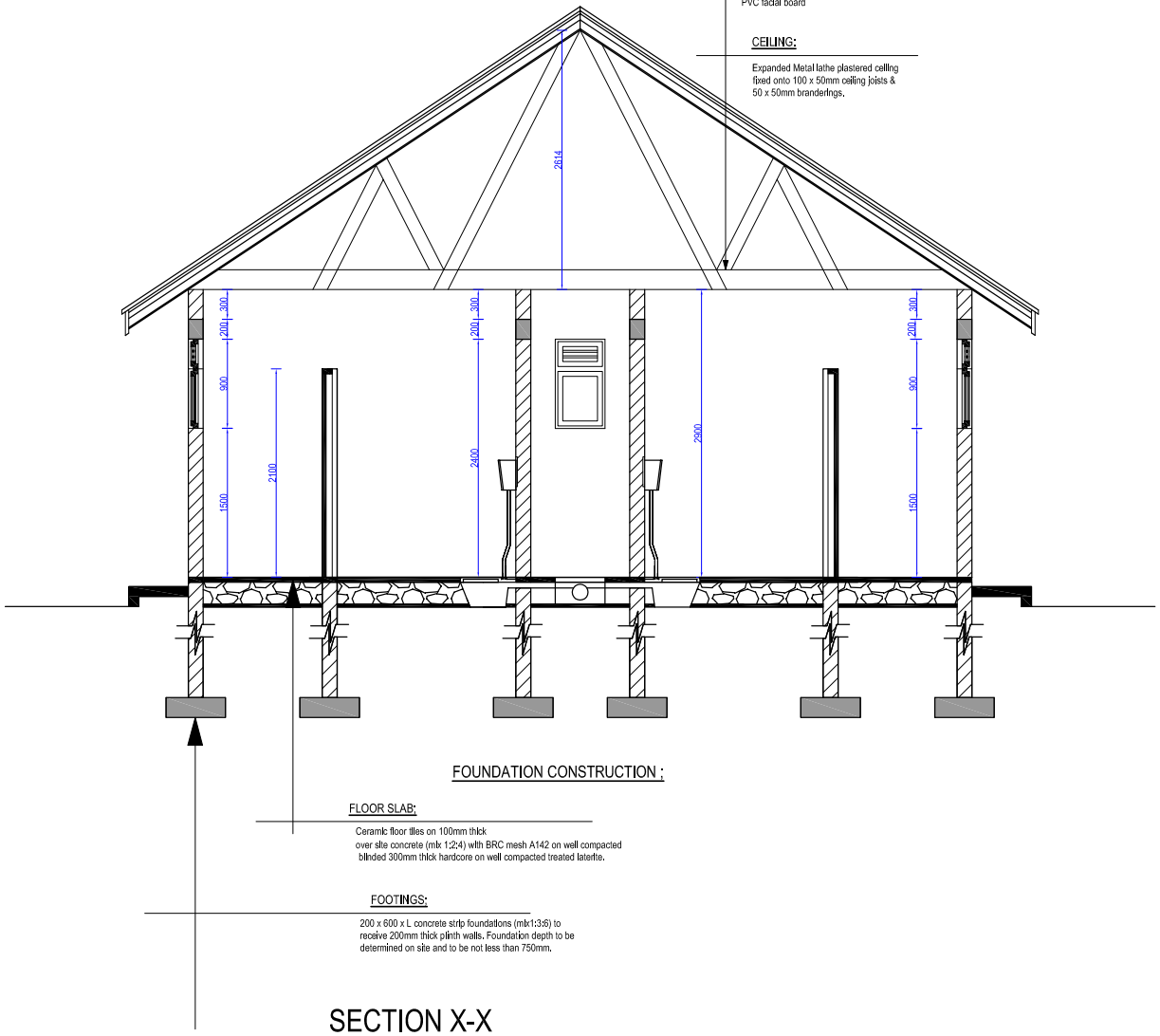
THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: WATER BORNE TOILET - PLAN	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/WBT/01	DATE: JUL. 21	SHEET 1 OF 4

ROOF SPECIFICATIONS:

33.5 deg. roof pitch, Pre - painted Gauge 28 iron roofing sheets nailed onto 100 x 50mm purlins on 100 x 50mm rafters with 100 x 50mm struts & ties on 150 x 50mm tie beam resting on 100 x 75mm wall plates.
PVC facial board

CEILING:

Expanded Metal lathe plastered ceiling fixed onto 100 x 50mm ceiling joists & 50 x 50mm branderings.



FOUNDATION CONSTRUCTION ;

FLOOR SLAB:

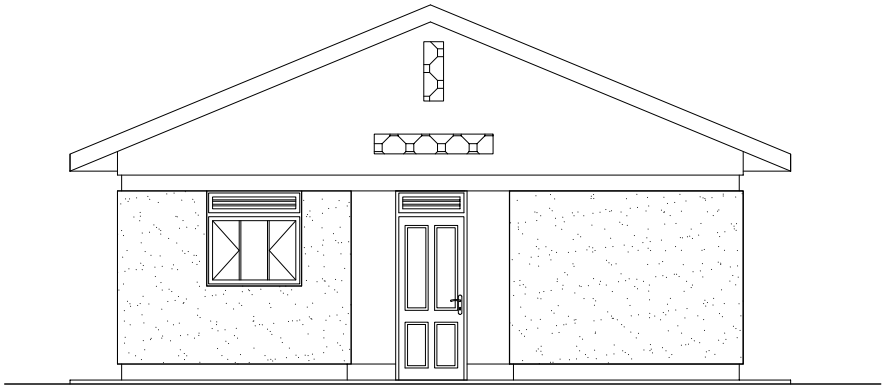
Ceramic floor tiles on 100mm thick over site concrete (mix 1:2:4) with BRC mesh A142 on well compacted blinded 300mm thick hardcore on well compacted treated laterite.

FOOTINGS:

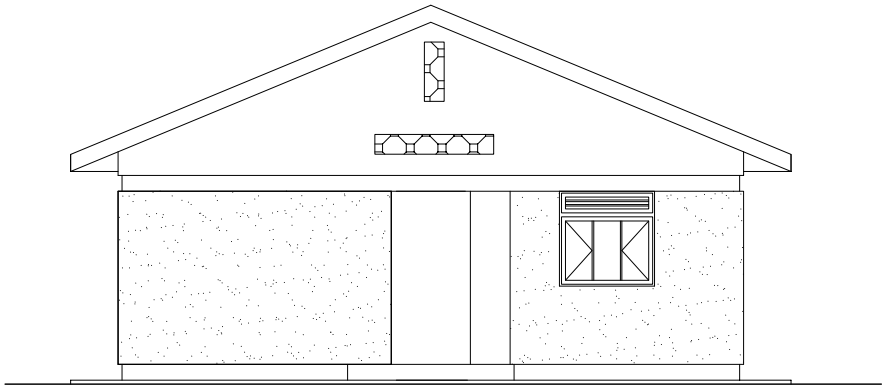
200 x 600 x L concrete strip foundations (mix1:3:6) to receive 200mm thick plinth walls. Foundation depth to be determined on site and to be not less than 750mm.

SECTION X-X

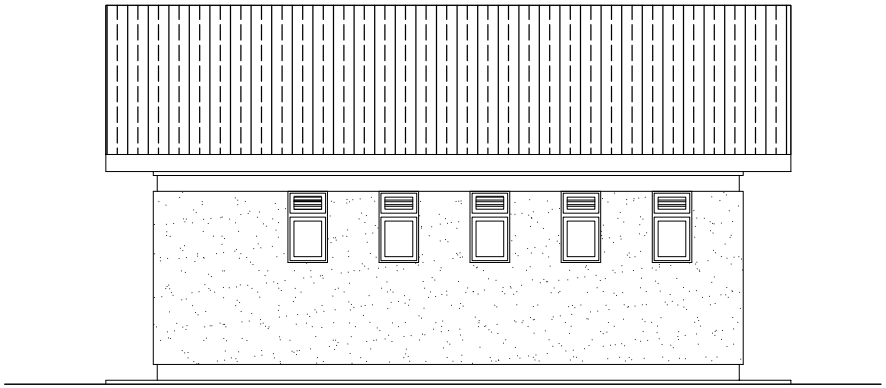
THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: WATER BORNE TOILET - SECTIONS DETAILS	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/WBT/02	DATE: JUL. 21	SHEET 2 OF 4



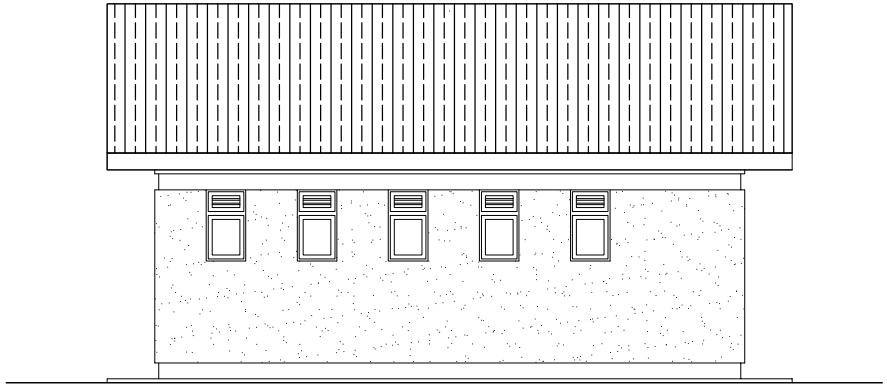
ELEVATION 1



ELEVATION 3



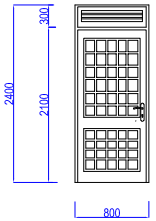
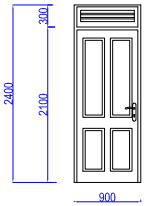
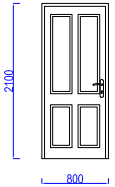
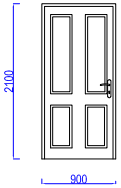
ELEVATION 2



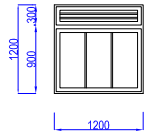
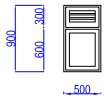
ELEVATION 4

THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: WATER BORNE TOILET - ELEVATIONS	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/WBT/03	DATE: JULY. 2021	SHEET 3 OF 4

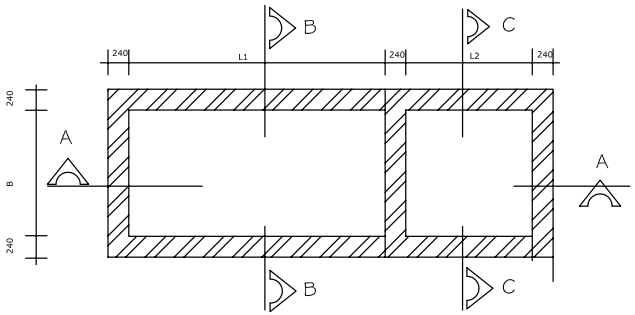
DOOR SCHEDULE

Mark	Size	Remarks	Number Required
D 1		STEEL OPEN GRILLED DOOR	2
D 2		STEEL CASEMENT PANNELLED DOOR	1
D 3		TIMBER PANELLED DOOR WITHOUT PERMANENT VENT ABOVE	7
D 4		TIMBER PANELLED DOOR WITHOUT PERMANENT VENT ABOVE	2

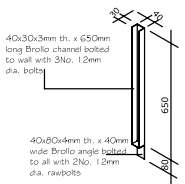
WINDOW SCHEDULE

Mark	Size	Remarks	Number Required
W 1		STEEL CASEMENT GLAZED WINDOW, SIDE HUNG OPENING OUT WITH PERMANENT VENT ABOVE	2
W 2		STEEL CASEMENT GLAZED WINDOW, TOP HUNGED WITH PERMANENT VENT ABOVE	11

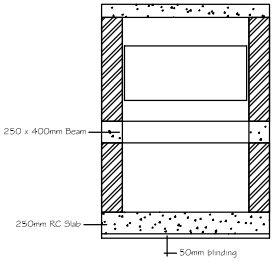
THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: WATER BORNE TOILET - DOOR & WINDOW SCHEDULE	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/WBT/04	DATE: JULY. 2021	SHEET 4 OF 4



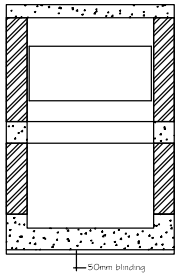
BASE SLAB PLAN



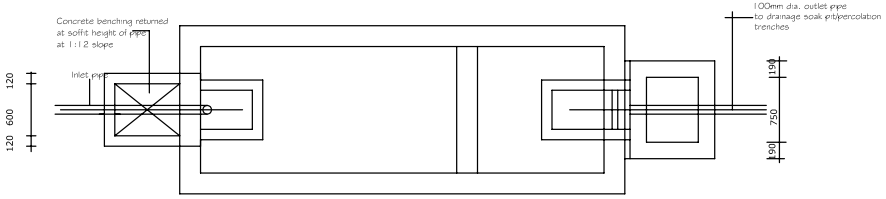
FIXING DETAIL OF SCUMBOARD (GALVANISED)



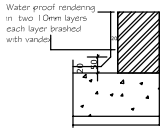
SECTION C - C



SECTION B - B

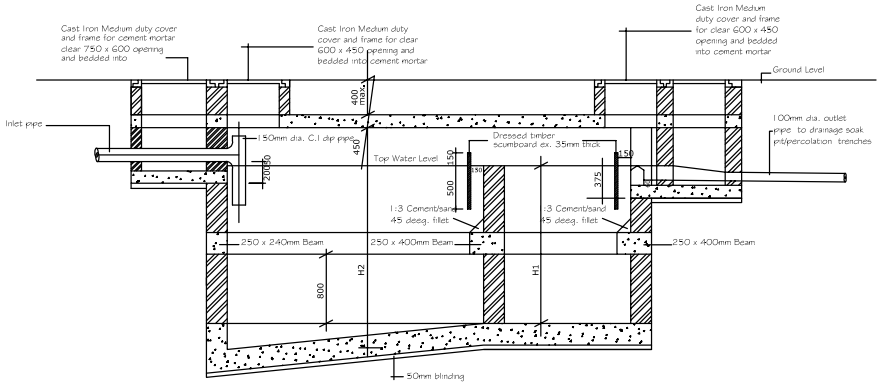


ROOF SLAB PLAN



INTERNAL WATER PROOF TO WALLS AND SLABS

CONC. WEIR BLOCK DETAIL

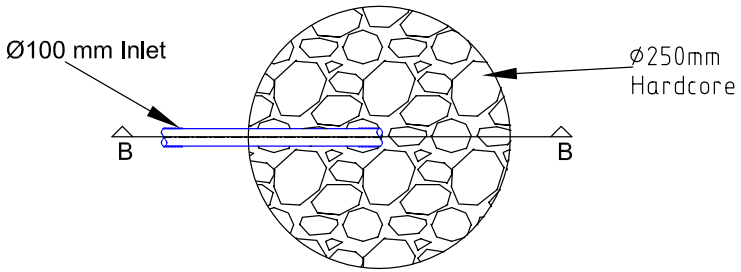


SECTION A - A

INTERNAL DIMENSIONS					CAPACITY	NO. OF USERS
L1	L2	H1	H2	B	Cu. M	
1540mm	760mm	1600mm	1750mm	760mm	3.2	10
1900mm	900mm	1800mm	2000mm	900mm	4.5	20
2000mm	1000mm	1800mm	2100mm	1100mm	5.9	30
2400mm	1100mm	1800mm	2100mm	1150mm	7.24	40
2500mm	1200mm	1800mm	2100mm	1300mm	8.6	50
2700mm	1300mm	1800mm	2100mm	1400mm	10	60
29000mm	1400mm	1800mm	2100mm	1450mm	11.3	70
3000mm	1500mm	1800mm	2100mm	1560mm	12.7	80
3200mm	1600mm	1800mm	2100mm	1600mm	14	90
3300mm	1700mm	1800mm	2100mm	1700mm	15.4	100
4000mm	2200mm	1800mm	2100mm	2190mm	24	150
4500mm	2700mm	1800mm	2100mm	2650mm	34.3	200

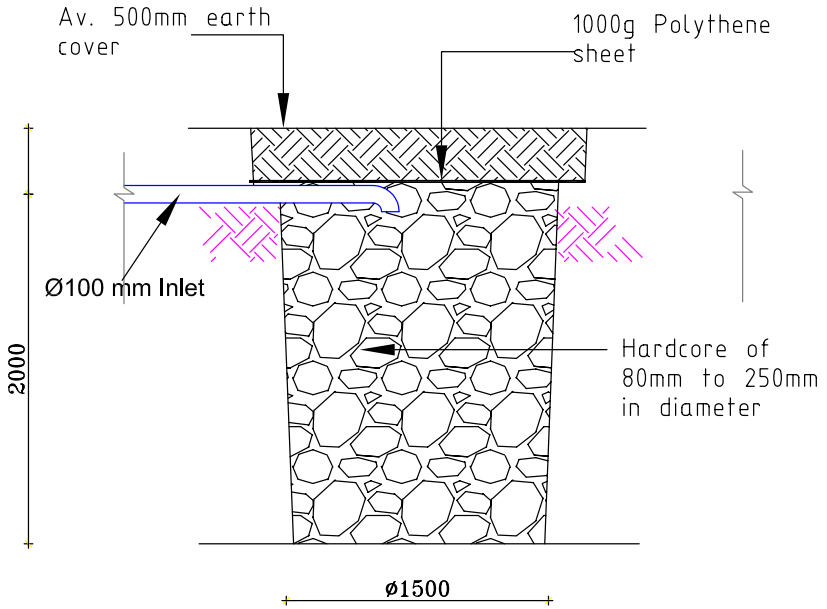
REGULATIONS AND COMPLIANCE

THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: SEPTIC TANK DETAILS	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/ST/01	DATE: JULY. 2021	SHEET 1 OF 1



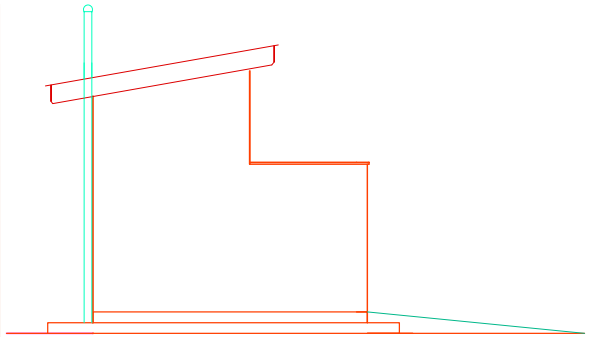
Plan

To be determined on site depending on max. water table

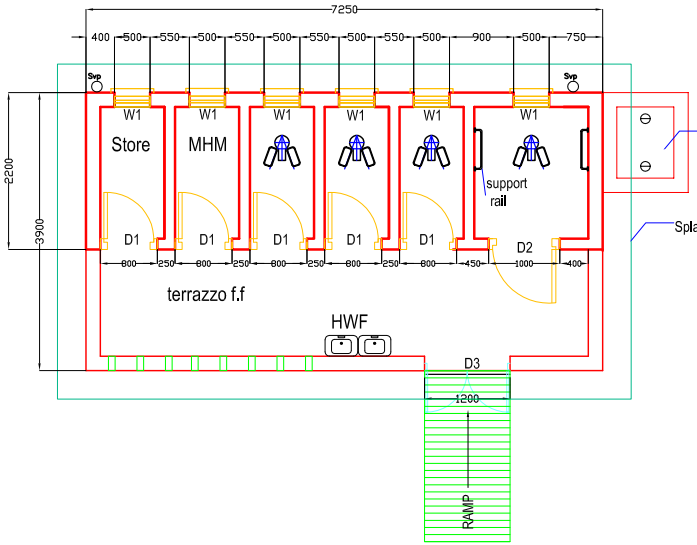


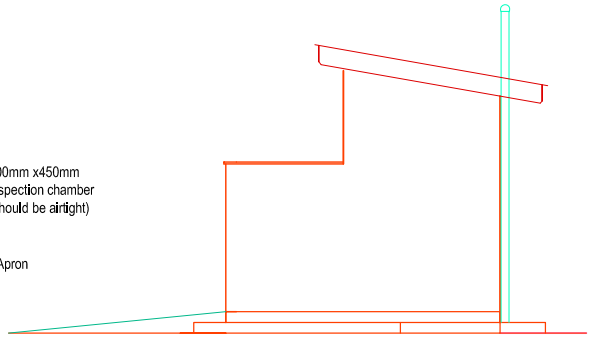
Section B - B

THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: SOAKAWAY PIT DETAILS	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/SAP/01	DATE: JULY. 2021	SHEET 1 OF 1

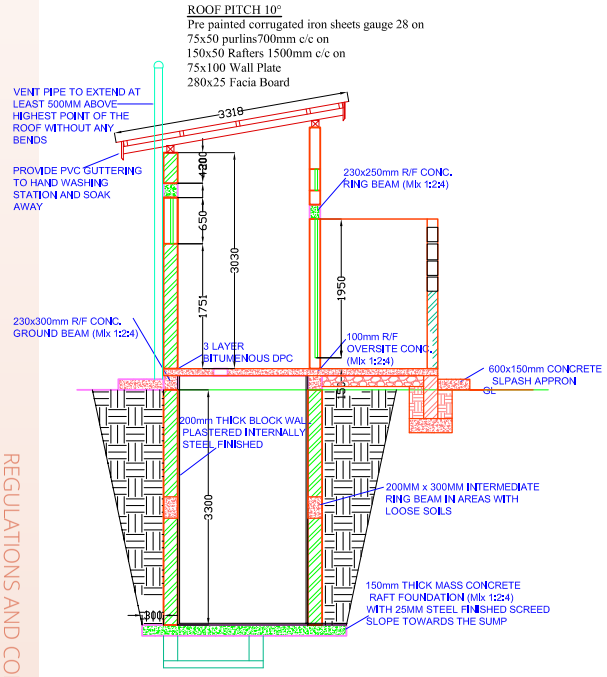


LEFT END ELEVATION scale 1:100

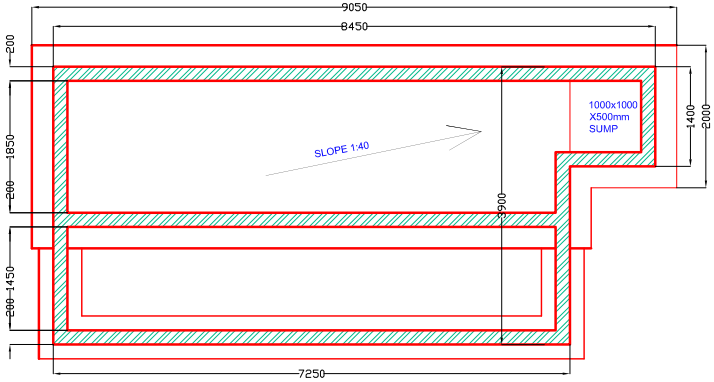




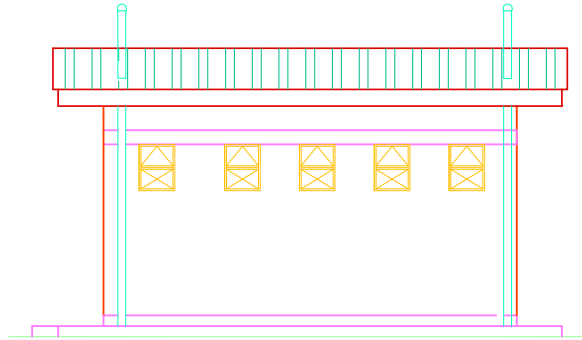
RIGHT END ELEVATION scale 1:100



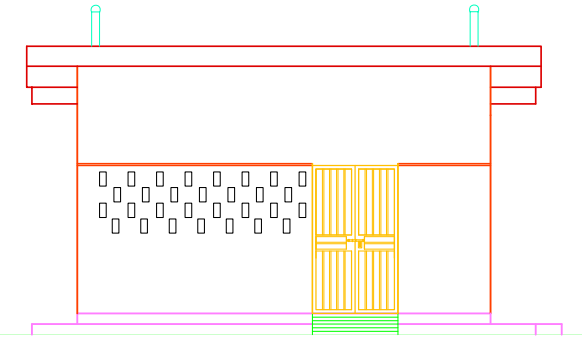
SECTION G-G scale 1:100



RAFT AND STRIP
FOUNDATION PLAN scale 1:100



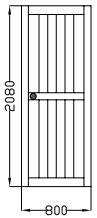
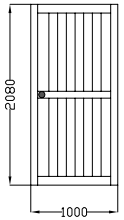
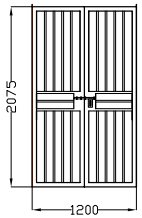
REAR ELEVATION scale 1:100



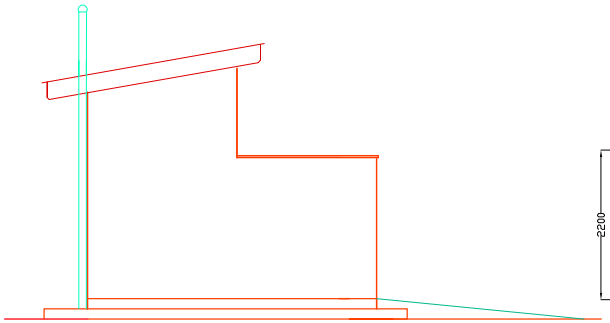
FRONT ELEVATION scale 1:100

REGULATIONS AND COMPLIANCE

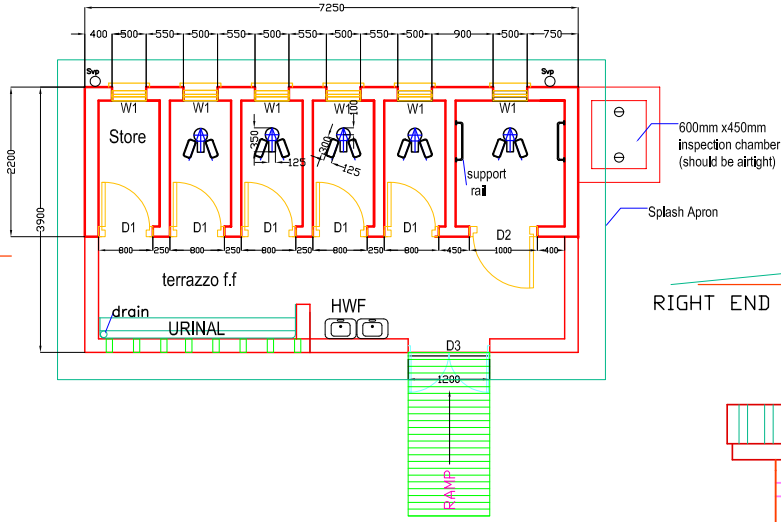
THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: LINED VIP LATRINE DETAILS FOR FEMALES	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/VIP/01	DATE: JUL. 21	SHEET 1 OF 4

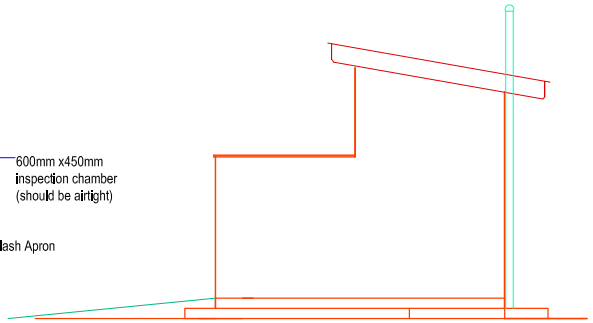
MARK	ELEVATION	DESCRIPTION	NUMBER REQUIRED
D1		Framed, ledged and braced external door 800 x 2080 x 25mm thick Ironmongery: Butt hinges 100mm 150mm barrel bolts	5
D2		Framed, ledged and braced external door 1000 x 2080 x 25mm thick Ironmongery: Butt hinges 100mm Three lever mortice lock	1
W1		Framed, ledged and braced window 650mm x 500mm Ironmongery: Butt hinges 75mm 150mm barrel bolts	6
D3		1200mm x 2075 x 4mm thick plate metallic door 50 x 50 x 4mm angles Ironmongery: Butt hinges 100mm Pull handles 150mm Approved heavy duty padlocks	1

THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: WINDOW AND DOOR SCHEDULE FOR THE FEMALES VIP LATRINE	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/VIP/01A	DATE: JUL. 21	SHEET 3 OF 4

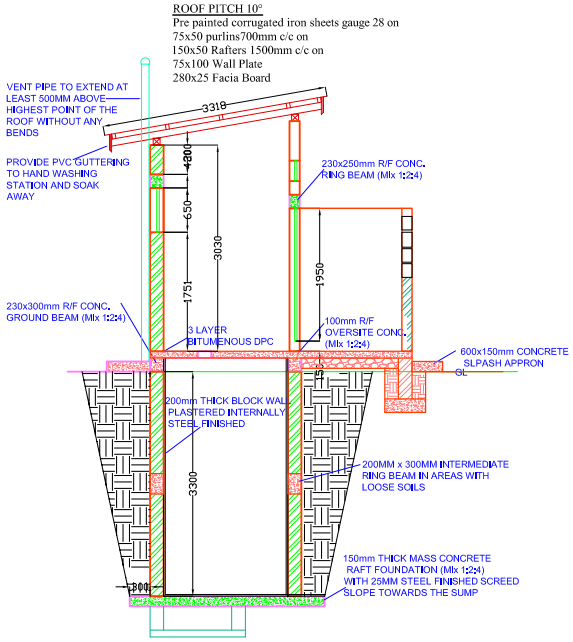


LEFT END ELEVATION scale 1:100

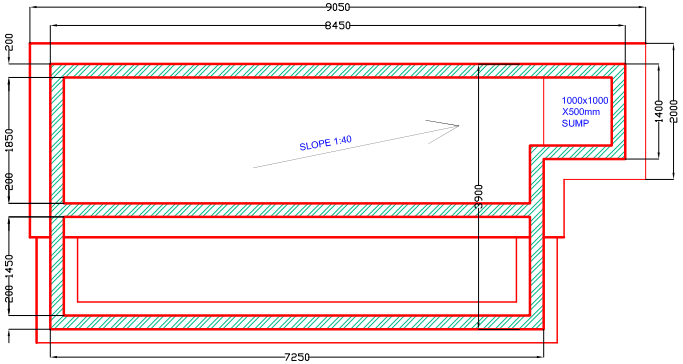




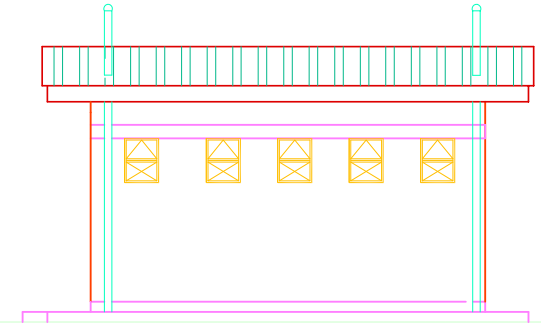
RIGHT END ELEVATION scale 1:100



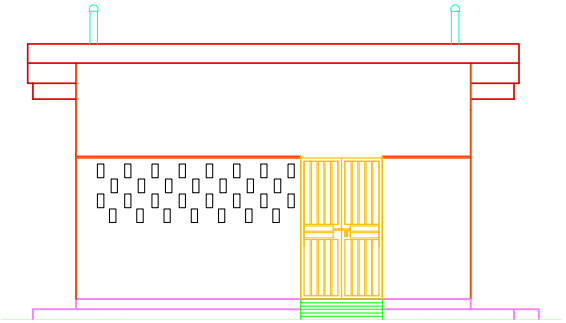
SECTION B-B scale 1:100



RAFT AND STRIP
FOUNDATION PLAN scale 1:100



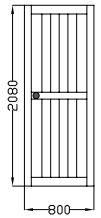
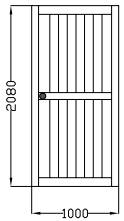
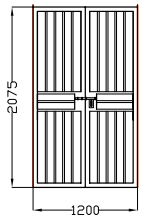
REAR ELEVATION scale 1:100



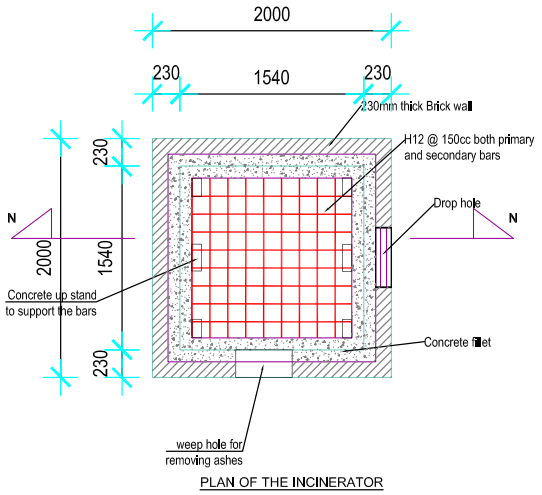
FRONT ELEVATION scale 1:100

REGULATIONS AND COMPLIANCE

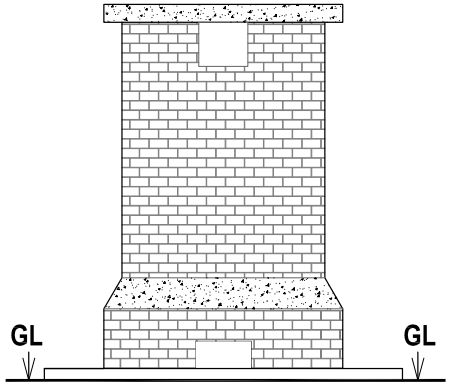
THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: LINED VIP LATRINE DETAILS FOR MALES	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/VIP/02	DATE: JUL. 21	SHEET 2 OF 4

MARK	ELEVATION	DESCRIPTION	NUMBER REQUIRED
D1		Framed, ledged and braced external door 800 x 2080 x 25mm thick Ironmongery: Butt hinges 100mm 150mm barrel bolts	5
D2		Framed, ledged and braced external door 1000 x 2080 x 25mm thick Ironmongery: Butt hinges 100mm Three lever mortice lock	1
W1		Framed, ledged and braced window 650mm x 500mm Ironmongery: Butt hinges 75mm 150mm barrel bolts	6
D3		1200mm x 2075 x 4mm thick plate metallic door 50 x 50 x 4mm angles Ironmongery: Butt hinges 100mm Pull handles 150mm Approved heavy duty padlocks	1

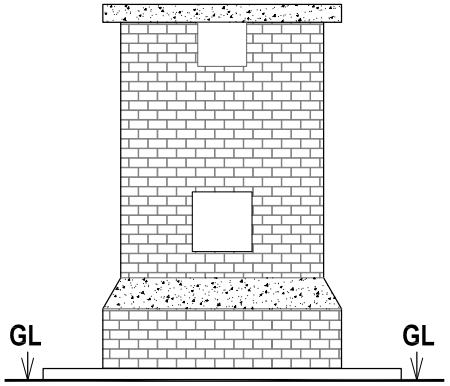
THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: WINDOW AND DOOR SCHEDULE FOR THE MALES VIP LATRINE	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/VIP/02A	DATE: JUL. 21	SHEET 4 OF 4



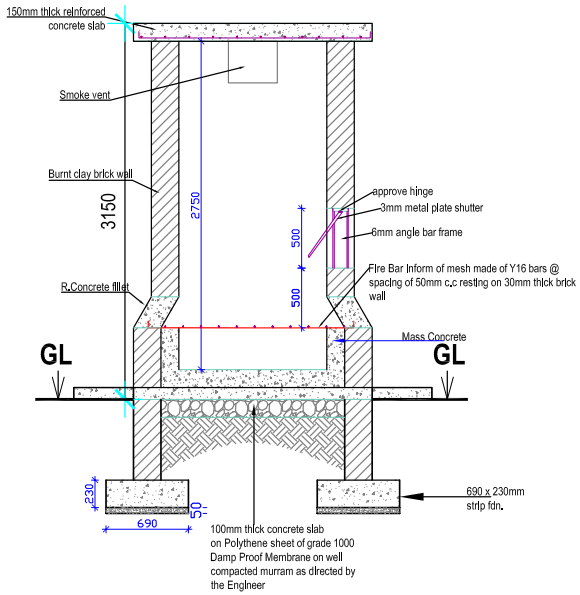
PLAN OF THE INCINERATOR



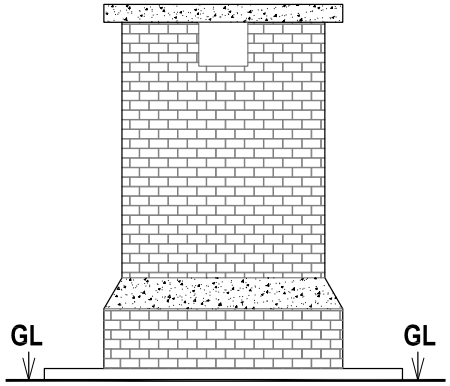
FRONT ELEVATION



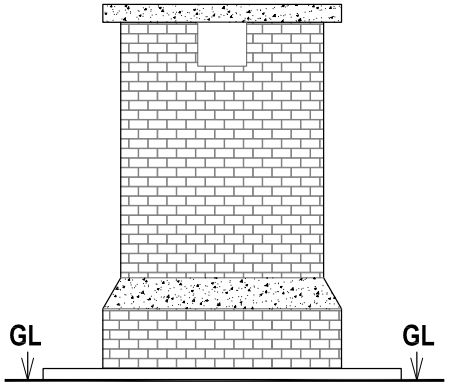
EAST ELEVATION



SECTION N-N



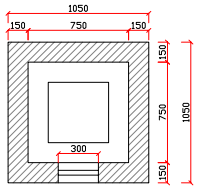
REAR ELEVATION



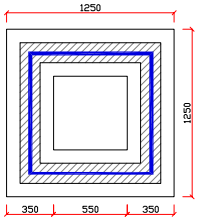
WEST ELEVATION

REGULATIONS AND COMPLIANCE

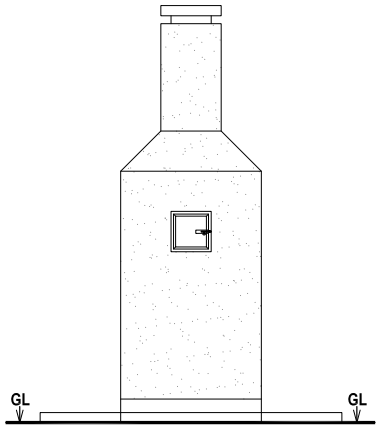
THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: INCINERATOR DETAILS CONSTRUCTED FROM MASONRY BRICKWORK	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/INC/01	DATE: JULY. 2021	SHEET 1 OF 2



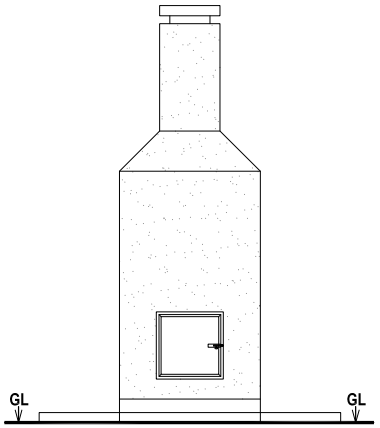
INCINERATOR PLAN



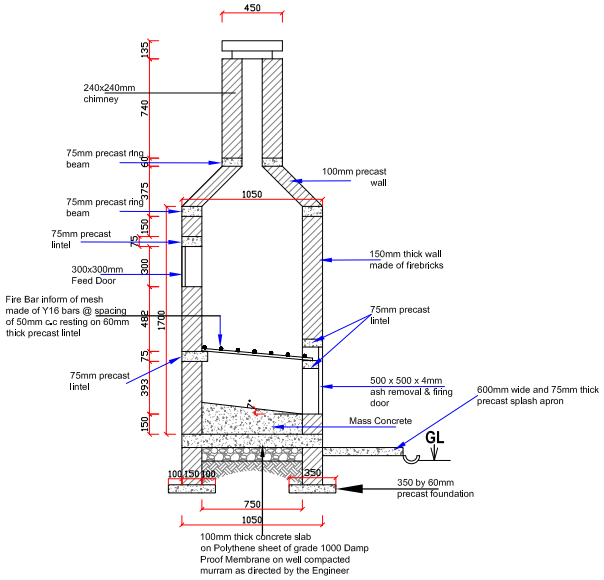
FOUNDATION LAYOUT



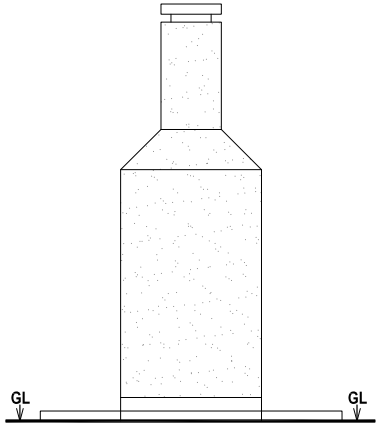
FRONT VIEW



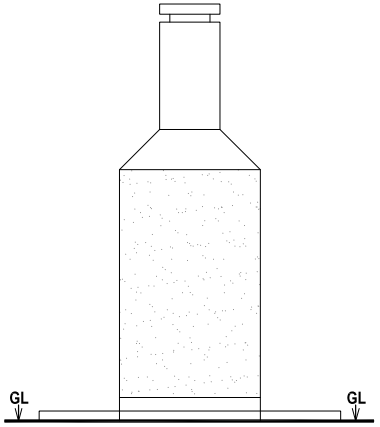
REAR VIEW



SECTION VIEW

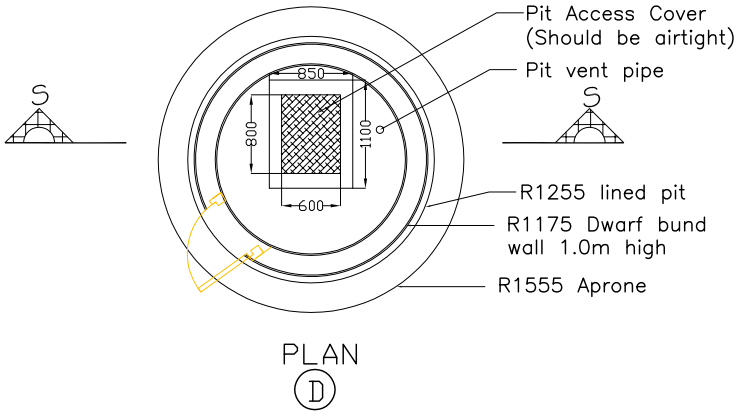


RIGHT SIDE VIEW

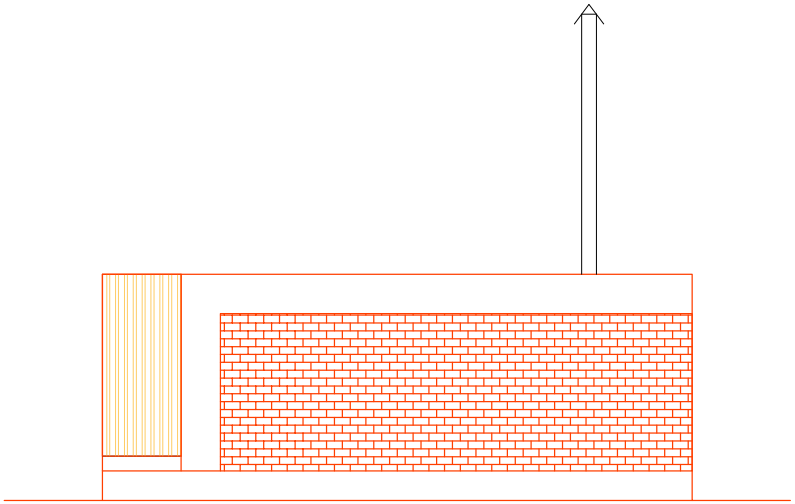


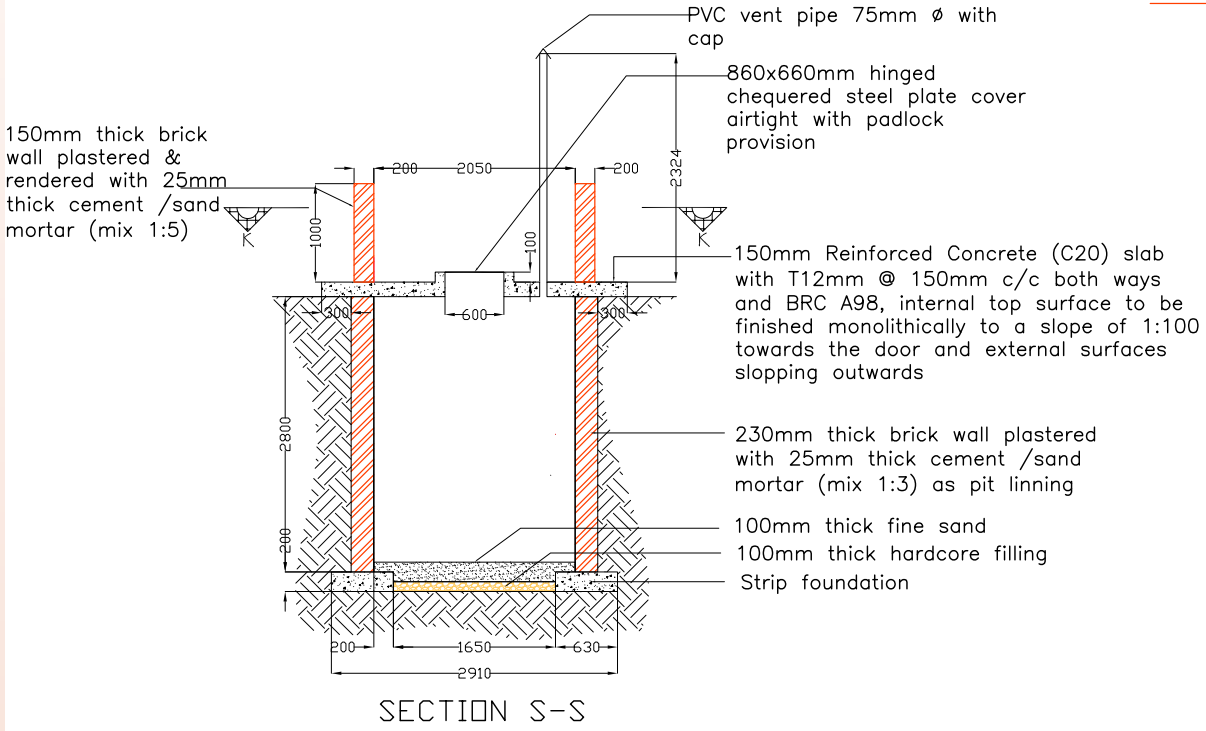
LEFT SIDE VIEW

THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: INCINERATOR DETAILS CONSTRUCTED FROM PRECAST SECTIONS	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/INC/02	DATE: JULY. 2021	SHEET 2 OF 2



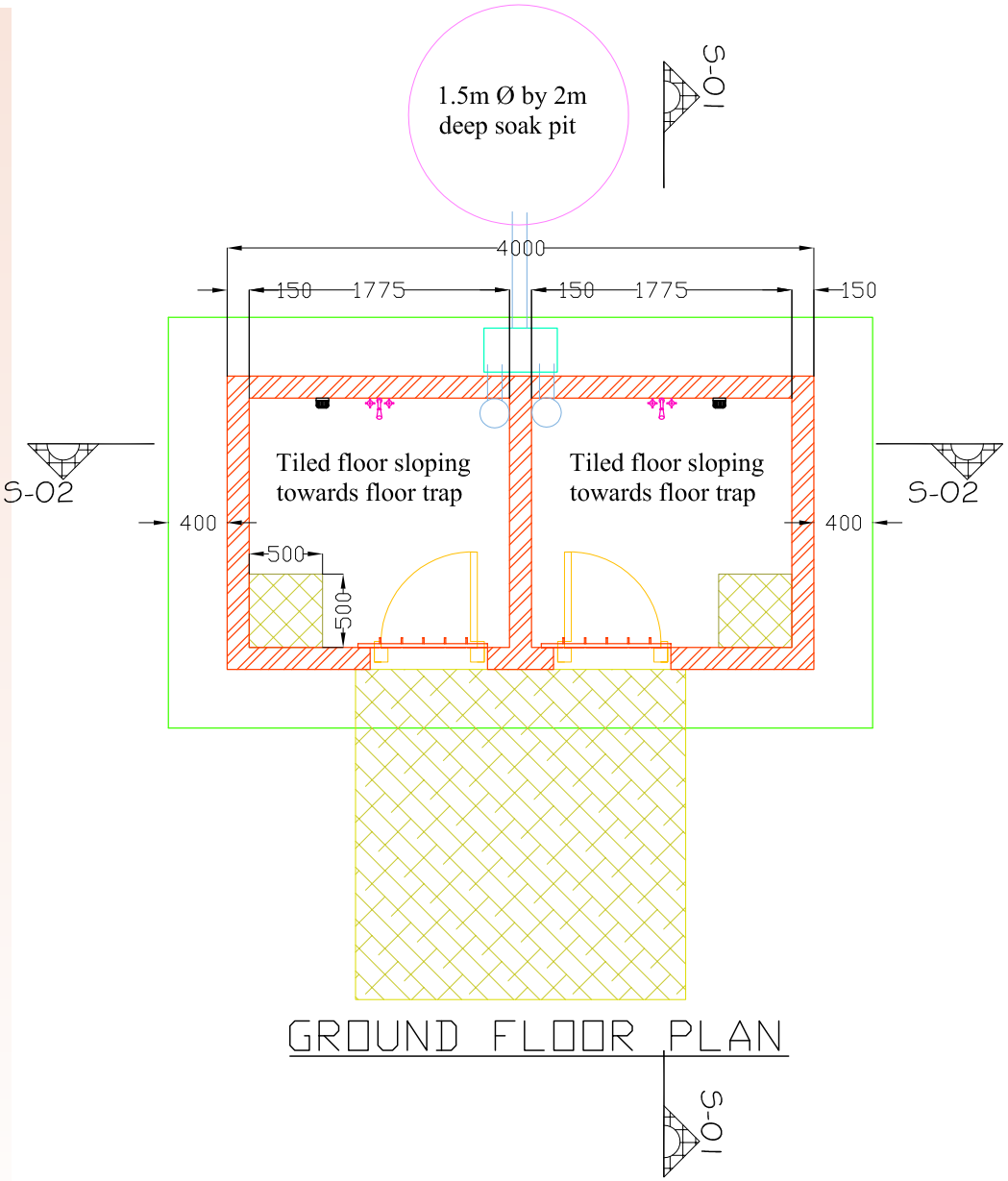
PLAN
(D)



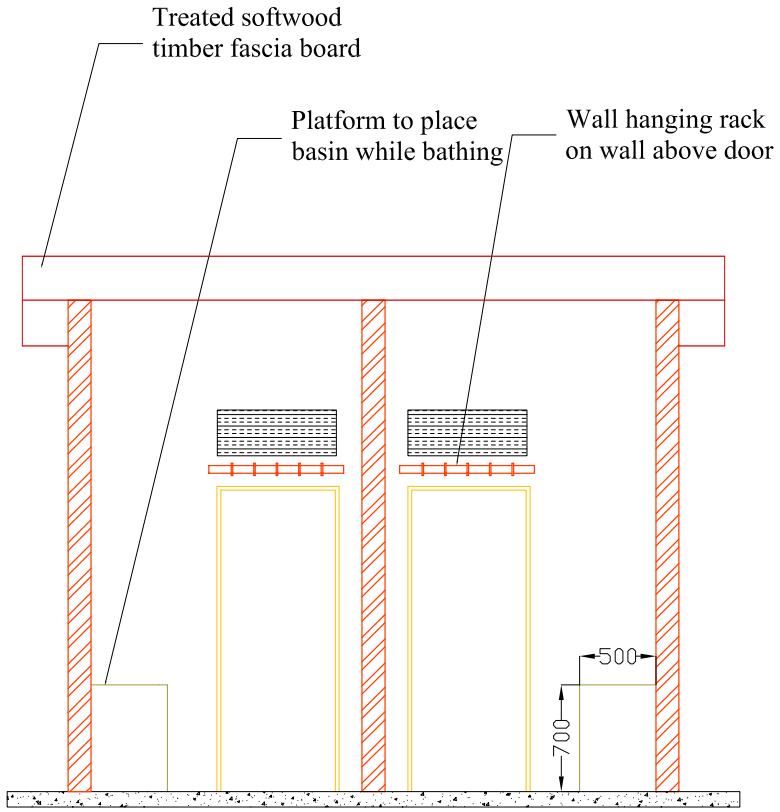


SECTION S-S

THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: PLACENTA PIT DETAILS	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/PP/01	DATE: JUL. 21	SHEET 1 OF 1



GROUND FLOOR PLAN

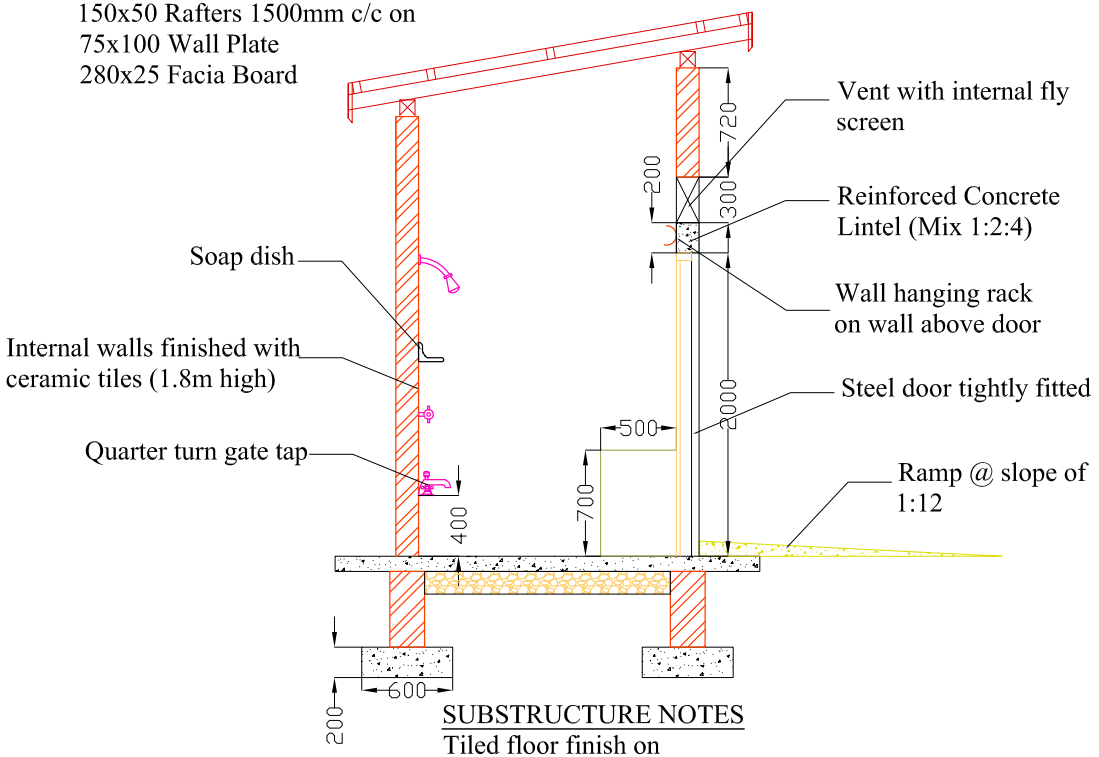


S-02 BUILDING SECTION

THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: BATH SHELTER - PLAN	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/BS/01	DATE: JUL. 21	SHEET 1 OF 2

ROOF PITCH 10°

Pre painted corrugated iron sheets gauge 28 on
75x50 purlins700mm c/c on
150x50 Rafters 1500mm c/c on
75x100 Wall Plate
280x25 Facia Board

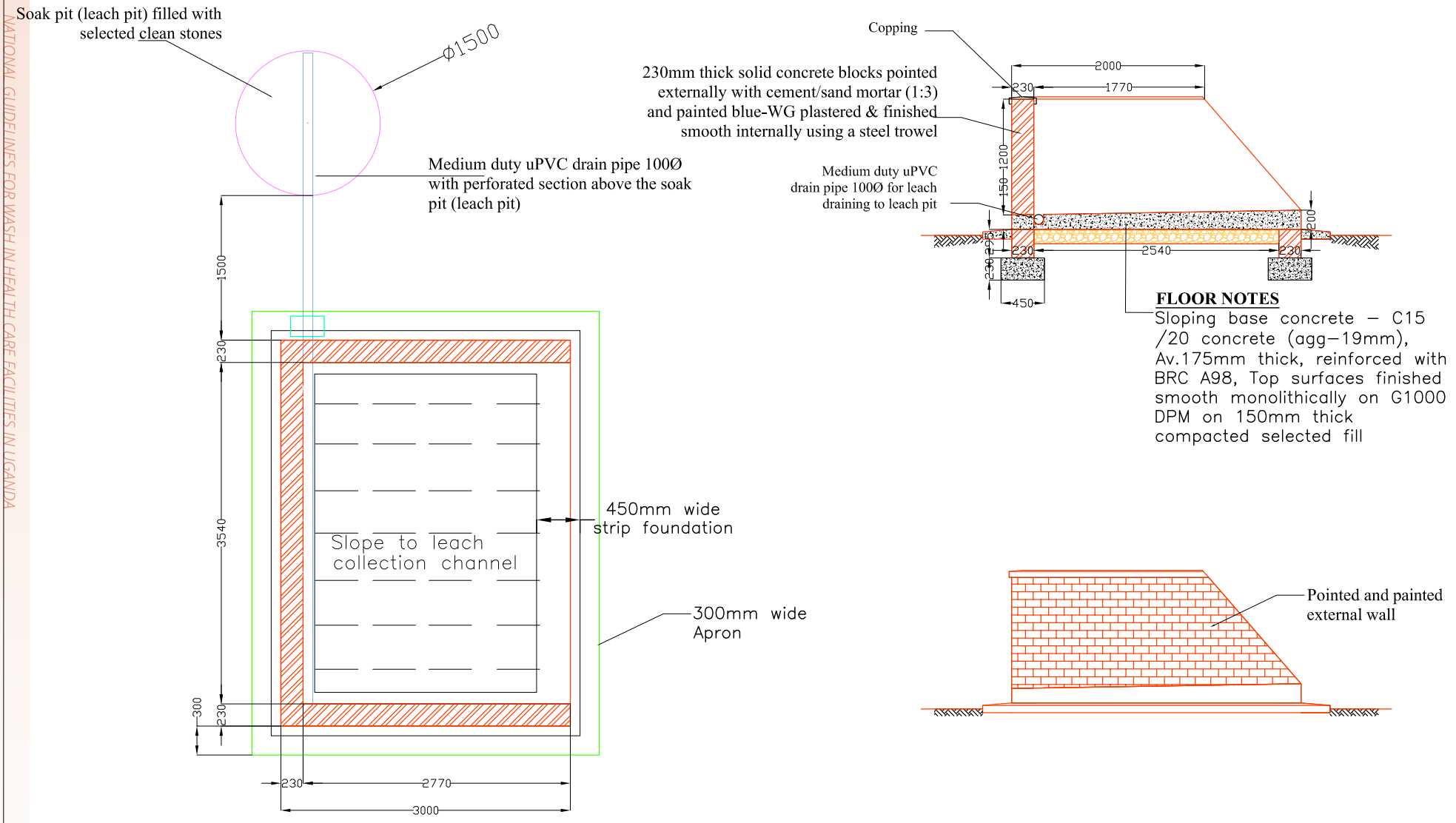


SUBSTRUCTURE NOTES

Tiled floor finish on
100mm thick C25 concrete on
1000gauge dpm polythene sheeting,
230mm wide dpc on
30mm sand blinding on
150mm hardcore bed,
230mm plinth walling
Foundation depth to be determined on site

S-01 BUILDING SECTION

THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: BATH SHELTER - SECTION DETAILS	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/BS/02	DATE: JUL. 21	SHEET 2 OF 2



THE REPUBLIC OF UGANDA MINISTRY OF HEALTH	THE NATIONAL GUIDELINES FOR WATER, SANITATION AND HYGIENE IN HEALTH CARE FACILITIES	DRAWN BY:	JNS	DRAWING TITLE: SOLID WASTE COLLECTION BUNKER	DATE	SCALE: NTS
		CHECKED BY:	PJM	DRAWING NO: MOH/WASH/SWCB/01	DATE: JUL. 21	SHEET 1 OF 1

Appendix 3: Bills of Quantities

MINISTRY OF HEALTH
NATIONAL GUIDELINES FOR WASH IN HEALTHCARE FACILITIES
BILL NO. 1
DESCRIPTION: WATER BORNE TOILET

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(UGX)	AMOUNT(UGX)
	Preamble: The relevant drawings are MOH/WASH/WBT/01, MOH/WASH/WBT/02, MOH/WASH/WBT/03 and MOH/WASH/WBT/04.				
	GENERAL SITE CLEARANCE				
	Clear the site of all weeds, bushes and trees. Level the site and plant grass to Engineer's satisfaction				-
D100	General site clearance	ha	0.0144		-
	EARTHWORKS				
	Excavation in material other than topsoil, rock or artificial hard material, commencing surface is the stripped ground level				-
E324	Depth 0.5-1m	m^3	80		-
	Excavation in rock material, commencing surface is the stripped ground level				
E332	Depth 0.25-0.5m	m^3	0.5		-
	Excavation Ancilliaries				
	Trimming of excavated surfaces in rock material				
E523	Surfaces inclined at an angle not exceeding 45 degrees to the horizontal	m^2	30		-
	Preparation of excavated surfaces in the following materials				-
E522	Material other than topsoil, rock, or artificial hard material inclined at an angle not exceeding 45 degrees to the horizontal	m^2	100		-
	Disposal of Excavated Material				
E535	Disposal of excavated material to sites as specified and as directed by the Engineer	m^3	61		
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Filling				
E613	Filling to structures in non selected excavated material other than top soil or rock	m^3	24.2		-
E614	Filling to structures in imported natural material other than top soil or rock (Sand blinding)	m^2	59		-
E617	300mm thick bed of approved imported hardcore well spread, leveled, rammed to consolidation on stabilized and compacted ground with blinding to Engineer's satisfaction	m^3	30		-
	IN-SITU CONCRETE				-
	Provision of Concrete				
	Designed Mix Concrete				
	Grade C15				
	Designed mix, grade C15 concrete, to BS 5328, with ordinary portland cement to BS 12, aggregate to BS 882, for the following aggregate sizes				
F233	20mm aggregate	m^3	4.0		
	Grade C20				-
	Designed mix, grade C20 concrete, to BS 5328, with ordinary portland cement to BS 12, 20mm aggregate to BS 882, for the following;				
F243.1	Plain concrete C20/20 to strip foundations, 150mm thick on firm ground and 100mm ground slab on hardcore and wall plinth	m^3	30.00		
F243.2	Reinforced concrete to floor slab, 150mm thick on blinded hardcore	m^3	34		-
F243.3	Splash apron, 150mm thick on blinded hardbore	m^3	9		
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Grade C25				
	Designed mix, grade C25 concrete, to BS 5328, with ordinary portland cement to BS 12, 20mm aggregate to BS 882, for the following;				
F253.1	Lintel size	m³	5.00		-
F253.2	Expanded metal lath ceiling, 100mm thick	m³	4.00		-
	Placing Mass Concrete				
					-
	Blinding				
	Placing blinding concrete, grade C15, of the following thickness				
					-
F511	Thickness not exceeding 150mm	m^3	4.00		-
	Placing mass concrete, grade C20 for bases, footings and ground slabs of the following thicknesses				
F521	Thickness not exceeding 150mm	m^3	39.00		
					-
	Placing Reinforced Concrete				
	Placing reinforced concrete, grade C20 for				
	Ground slabs of the following thicknesses				
					-
F621	Thickness not exceeding 150mm	m^3	34.00		-
	Placing reinforced concrete, grade C25 for suspended slabs of the following thicknesses				
F631	Thickness 100mm	m^3	4.00		
	Placing reinforced concrete, grade C25 for				
	lintels of the following cross sectional areas				
F662	150 x 200mm	m^3	5.00		-
					-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	CONCRETE ANCILLARIES				
	Formwork				
	Fair finish formwork in horizontal plane of the following width				
G215	Width exceeding 1.22m	m^2	54.4		
	Fair finish formwork in vertical plane of the following width				-
G242	Width 0.1-0.2m	m	108.7		
	Reinforcement				-
	Plain rounded steel bars to BS4449 and of the following sizes				
G512	Nominal size, 8mm	t	0.01		
	Deformed high yield steel bars to BS4449 and of the following sizes				-
G524	Nominal size, 6mm-12mm	t	0.4		
G567	Steel fabric reinforcement to BS4483 , fabric A252	m^2	60		
	Concrete Accessories				
G811	Finishing of top surfaces with wood float	m^2	78		
	BRICKWORK, BLOCKWORK AND MASONRY				-
U511	150mm thick walls in approved solid blocks	m^2	83		
	bonded in 1:4 cement sand mortar				
	PAINTING				
	High Gloss Oil Paint				-
V323	External quality high gloss oil paint, two coats, to facia board include surface preparation and undercoat	m^2	20		
V333	External quality high gloss oil paint, two coats, to smooth concrete surfaces; include surface preparation as specified	m^2	50		
					-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Emulsion Paint				-
V567.1	Internal quality vinyl silk emulsion paint , under coat & two overcoats, to interior block work wall surfaces to the Engineer's satisfaction, include surface preparation as specified	m²	50		-
V567.2	Exterior quality weather guard paint , under coat & two overcoats, to rendered block work wall surfaces to the Engineer's satisfaction, include surface preparation as specified	m²	50		-
	WATER PROOFING				-
	Damp Proof				
	Damp proof course of bitumen impregnated fabric to BS 6398 for the following wall thicknesses				
W116	150mm	m	20		-
	Rendering				
W153	Rendering to walls in ordinary cement mortar	m²	50		
	Roofing				-
W321	Construct roofing, complete as in the drawings and as specified; with galvanised blue factory pre-painted profiled iron sheets, gauge 28, complete with purlins, rafters, wall plate, 225x25mm facia board with wood protection coat, and uPVC rain water guttering and drainage feeding the rain water harvesting tank all to the Engineer's satisfaction	m²	80		-
	Protective Layers				
W421	Flexible polyethylene sheeting, gauge 1000, or similar approved, laid to the surface of blinding concrete or sand blinded hardcore fill	m²	20		-
					-
					-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
W443.1	Apply rough cast to rendered external wall surfaces to the Engineer's satisfaction	m²	125		
W443.2	1:4 cement sand screed externally to walls 25mm thick and finish with wooden float and rough cast to Engineer's satisfaction	m²	80		-
W443.4	1:4 cement-sand screed internally to walls 25mm thick and finish smooth with steel float and apply three coats of silk vinyl paint after applying undercoat to the Engineer's satisfaction	m²	230		-
W441	1:3 cement sand 25mm floor screed finished to hard and smooth surface with a steel float using cement grout	m²	60		-
W453	1:4 cement-sand screed internally to walls 25mm thick and finish with wooden float to the Engineer's satisfaction; fix approved wall tiles to 2000mm high skirting in Toilet. Finish joints with white cement grout	m²	14		-
W457	Supply and Fix ceramic tiles to all floors and internal walls of Public Toilet and finish joints with white cement grout to Engineer's Satisfaction	m²	100		
	Windows, Doors and Glazing				
	Windows				
	Supply and fix mild steel casement glazed windows (including vents), side hung opening out with permanent vent above constructed from standard steel sections primed with Redoxide paint before delivery to site complete with all necessary iron mongery and plugging and fixing to head jamb and cill including 3 coats of appropriate paint after installation of the following sizes				-
Z321.1	1200 x 900 mm high comprising 300mm permanent louvred vent with transluscent glass to Engineer's Approval	nr	2		
Z321.2	500 x 600 mm high comprising 300mm permanent louvred vent with transluscent glass to Engineer's Approval	nr	1		-
					-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Doors Supply and fix mild steel casement panelled doors (including vents), side hung opening out with permanent vent above constructed from standard steel sections primed with Redoxide paint before delivery to site complete with all necessary iron mongery and plugging and fixing to head jamb and cill including 3 coats of appropriate paint after installation of the following sizes				-
Z323.1	Single leaf mild steel casement panelled door size 900 x 2100mm high comprising 300mm permanent louvred vent including a door frame made of 150x50mm steel material to Engineer's Satisfaction	nr	8		-
Z323.1	Single leaf mild steel casement panelled door size 1000 x 2100mm high comprising 300mm permanent louvred vent including a door frame made of 150x50mm steel material to Engineer's Satisfaction	nr	4		-
	MISCELLANEOUS WORKS **Sanitary Fittings** Supply and Fix the following sanitary appliances all to Engineer's satisfaction				-
X900.1	Supply and install vitreous UK white glazed WC suite comprising pan with P trap, 9 litres low level vitreous UK water cistern and lid, plastic flushing pipe, heavy duty seat and cover with plastic bottom fix hinges, inlet connection and including assembling and joining to uPVC sewer pipes, water connection and all accessories	nr	2		-
X900.2	Suppy and install vitreous UK white glazed general puprpose squatting WC complete with floor level WC bowl, high level 7.5ltr cistern, P trap outlet connector complete with all accessories and fittings	nr	5		
X900.3	Vitreous UK White glazed wash hand basin size 550x400mm complete with 1no. 13mm diameter chromium plated elbow operated tap, 32mm waste outlet grating, plastic plug and chain stay, plastic bottle trap, concealed cast iron fixing brackets, jointing and water connection	nr	2		
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Water Supply				-
X900.4	Supply and erect a 2000 ($2m^3$) polyethylene tank from crestank, elevated on steel 3m high, complete with ND15mm GI riser pipe, up to 50m of OD 20mm HDPE sevice pipe to PN10, ND 20mm GI outlet pipe, ball valve, kent consumer water meter and all necessary fittings to ensure water supply to the Public Toilet, inclusive of connection from distribution line to elevated tank all to the Engineer's satisfaction.	nr	1		-
X900.5	Supply and Install 5000 ($5m^3$) polyethylene rain harvesting tank from crestank, including 1m concrete plinth above ground level, complete with tap for hand washing and overflow to the Engineer's satisfaction	Sum	1		-
	Anti-Termite Treatment				
	Provide Anti-Termite treatment to the following surfaces				-
X900.6	Sides and bottoms of foundations	m^2	151.02		
X900.7	Stripped surfaces of ground	m^2	30.2		
X900.8	Blinded surfaces of hardcore	m^2	51.64		-
	Septic Tank				
X900.9	Construct One (1) nr septic tank and one (1) nr soak pit for waste water from toilets, complete with sewer pipeline as specified and to the Engineers approval	Sum	1		
X900.10	Lightening protection for house	Sum	1		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	COLLECTION				
	Collection, Page 1 of 8				-
	Collection, Page 2 of 8				-
	Collection, Page 3 of 8				-
	Collection, Page 4 of 8				-
	Collection, Page 5 of 8				-
	Collection, Page 6 of 8				-
	Collection, Page 7 of 8				-
	Collection, Page 8 of 8				-
		Carried to Summary			-

MINISTRY OF HEALTH
NATIONAL GUIDELINES FOR WASH IN HEALTHCARE FACILITIES
BILL NO. 2
DESCRIPTION: VIP LATRINE FOR FEMALES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(UGX)	AMOUNT(UGX)
	Preamble: The relevant drawings are MOH/WASH/VIP/01 and MOH/WASH/VIP/01A.				
	GENERAL SITE CLEARANCE				
	Clear the site of all weeds, bushes and trees. Level the site and plant grass to Engineer's satisfaction				-
D100	General site clearance	ha	0.006		-
	EARTHWORKS				
	Excavation for foundations				
	Excavate oversite to remove Top soil				
E311	Depth not exceeding 0.25m	m^3	9		-
	Excavation in material other than topsoil, rock or artificial hard material, commencing surface is the stripped ground level				
E323	Depth 0.5-1m	m^3	4		-
E325	Depth 2-5m	m^3	68		-
	Excavation Ancilliaries				
	Preparation of excavated surfaces in the following materials				
E522	Material other than topsoil, rock, or artificial hard material	m^2	60		-
	Disposal of Excavated Material				
E531	Topsoil to temporary stockpile on site for re-use	m^3	10		-
E532	Disposal of excavated material other than topsoil, rock or artificial hard material to sites as specified and as directed by the Engineer	m^3	65		-
			Carried to Collection		-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Filling				
E613	Filling to structures in non selected excavated material other than top soil or rock	m^3	10.0		-
E647	150mm thick bed of approved imported hardcore well spread, leveled, rammed to consolidation on stabilized and compacted ground with blinding to Engineer's satisfaction	m^2	62		-
	Filling Ancillaries				
	Preparation of filled surfaces				
E722	50mm sand blinding layer of compacted sand to compated hardcore well watered and rolled to receive concrete	m^2	62		-
	IN-SITU CONCRETE				-
	Provision of Concrete				
	Designed Mix Concrete				
	Grade C15				
	Designed mix, grade C15 concrete, to BS 5328, with ordinary portland cement to BS 12, aggregate to BS 882, for the following aggregate sizes				
F233	20mm aggregate	m^3	18.0		-
	Grade C20				
	Designed mix, grade C20 concrete, to BS 5328, with ordinary portland cement to BS 12, 20mm aggregate to BS 882, for the following;				
F243.1	Plain concrete C20/20 to strip foundations, 150mm thick on firm ground and 100mm ground slab on hardcore and wall plinth	m^3	8.00		-
F253.1	Reinforced concrete grade C25/20 to ground beam and ring beam	m^3	4		-
F243.3	Splash apron, 150mm thick on blinded hardbore	m^3	3		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Grade C25				
	Designed mix, grade C25 concrete, to BS 5328, with ordinary portland cement to BS 12, 20mm aggregate to BS 882, for the following;				
F253.1	Reinforced concrete to the ground beam	m^3	1.50		-
F253.2	Reinforced concrete to the ring beam	m^3	1.50		-
	Placing Mass Concrete				
					-
	Blinding				
	Placing blinding concrete, grade C15, of the following thickness				
					-
F511	Thickness not exceeding 150mm	m^3	18.00		-
	Plain concrete				
	Placing mass concrete, grade C20 for bases, footings and ground slabs of the following thicknesses				
F521	Thickness not exceeding 150mm	m^3	11.00		-
					-
	Placing Reinforced Concrete				
	Placing reinforced concrete, grade C20 for Ground slabs of the following thicknesses				
					-
F621	Thickness not exceeding 150mm	m^3	4.00		-
					-
	Placing reinforced concrete, grade C25 for beams of the following cross-sectional areas				-
					-
F661	Cross-sectional area not exceeding 0.03 m^2	m^3	3.00		-
	CONCRETE ANCILLARIES				
	Formwork				
	Fair finish formwork in horizontal plane of the following width				
G215	Width exceeding 1.22m	m^2	18		-
	Fair finish formwork in vertical plane of the following width				-
					-
G242	Width 0.1-0.2m	m	66		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Reinforcement				
	Plain rounded steel bars to BS4449 and of the following sizes				
G512	Nominal size, 8mm	t	0.04		-
	Deformed high yield steel bars to BS4449 and of the following sizes				-
G524	Nominal size, 6mm-12mm	t	0.2		-
G567	Steel fabric reinforcement to BS4483 , fabric A252	m^2	30		-
	Concrete Accessories				-
G811	Finishing of top surfaces with wood float	m^2	30		-
	BRICKWORK, BLOCKWORK AND MASONRY				-
U121	230mm thick walls in well burnt clay bricks bedded and jointed in 1:3 cement sand mortar with 25 x 1.5mm thick metal strip at every third coarse.	m^2	201		-
	PAINTING				-
	High Gloss Oil Paint				-
V326	External quality high gloss oil paint, two coats, to facia board include surface preparation and undercoat	m	25		-
V333	External quality high gloss oil paint, two coats, to smooth concrete surfaces; include surface preparation as specified	m²	6		-
	Emulsion Paint				-
V567.1	Internal quality vinyl silk emulsion paint , under coat & two overcoats, to interior brick work wall surfaces to the Engineer's satisfaction, include surface preparation as specified	m²	182		-
V567.2	Exterior quality weather guard paint , under coat & two overcoats, to rendered brick work wall surfaces to the Engineer's satisfaction, include surface preparation as specified	m²	85		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	WATER PROOFING				
	Damp Proofing				
	Damp proof course of bitumen impregnated fabric to BS 6398 for the following wall thicknesses				
					-
W116	Bituminous felt horizontal damp proof course 230mm wide under walling with 200mm overlaps at joints	m	62		-
					-
	Rendering				-
					-
W153.1	1:4 cement- screed plaster externally to walls 25mm thick and finish with wooden float and roughcast to engineer's satisfaction	m²	85		-
					-
W153.2	1:4 cement- screed plaster internally to walls 25mm thick and finish smooth with steel float to enginee's satisfaction	m²	182		-
					-
	Roofing				-
					-
W321	Construct roofing, complete as in the drawings and as specified; with galvanised blue factory pre-painted profiled iron sheets, gauge 28, complete with purlins, rafters, wall plate, 225x25mm facia board with wood protection coat, and uPVC rain water guttering and drainage feeding the rain water harvesting tank all to the Engineer's satisfaction	m²	52		-
	Protective Layers				-
W441.2	1:3 cement sand mortar 25mm thick floor screed finished to hard and smooth surface with a steel float using cement grout	m²	33		-
W441.2	Terrazo floor finish	m²	33		-
W446	20 x 100mm high skirting with rounded top edge and covered junction with paving	m	43		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Windows, Doors and Glazing				
	Windows				-
	Supply and fix mild steel casement glazed windows (including vents), side hung opening out constructed from standard steel sections primed with Redoxide paint before delivery to site complete with all necessary iron mongery and plugging and fixing to head jamb and cill including 3 coats of appropriate paint after installation of the following sizes				-
Z321.1	500 x 650 mm high with 4mm thick transluscent glass to Engineer's Approval	nr	1		- -
	Doors				- -
	Supply and fix mild steel casement panelled doors (including vents), side hung opening out constructed from standard steel sections primed with Redoxide paint before delivery to site complete with all necessary iron mongery and plugging and fixing to head jamb and cill including 3 coats of appropriate paint after installation of the following sizes				-
Z323.1	Single leaf mild steel casement panelled door size 800 x 2080mm high including a door frame made of 150x50mm steel material to Engineer's Satisfaction	nr	5		- -
Z323.2	Single leaf mild steel casement panelled door size 1000 x 2080mm high including a door frame made of 150x50mm steel material to Engineer's Satisfaction	nr	1		- -
Z323.3	Single leaf mild steel casement panelled door size 1200 x 2075mm high including a door frame made of 150x50mm steel material to Engineer's Satisfaction	nr	1		- -
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	MISCELLANEOUS WORKS				-
	Sanitary Fittings				
	Supply and Fix the following sanitary appliances all to Engineer's satisfaction				
X900.1	Vitreous UK White glazed wash hand basin size 550x400mm complete with 1no. 13mm diameter chromium plated pillar tap, 32mm waste outlet grating, plastic plug and chain stay, plastic bottle trap, concealed cast iron fixing brackets, jointing and water connection	nr	2		-
X900.2	Supply and Install 1000 ($1m^3$) polyethylene rain harvesting tank from crestank, including 1m concrete plinth above ground level, complete with tap for hand washing and overflow to the Engineer's satisfaction	Sum	1		- -
X900.3	Supply and Install OD110mm uPVC vent pipes	m	11		-
	Inspection Chamber				-
X900.4	Construct a 600mm x 450mm x 900mm deep inspection chamber in 230mm thick well burnt clay brickwork, bedded and jointed in cement and sand (1:3) mortar, walls finished with 20mm cement, lime and sand (1:2:9) plaster in two coats steel trowelled hard and smooth on walls internally.	LS	1		-
X900.5	Supply and install a reinforced concrete cover of size 650mm x 500mm x 50mm	No.	1		
	Anti-Termite Treatment				-
	Provide Anti-Termite treatment to the following surfaces				-
X900.6	Sides and bottoms of foundations	m^2	56		- -
X900.7	Stripped surfaces of ground	m^2	40		- -
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	COLLECTION				
	Collection, Page 1 of 7				-
	Collection, Page 2 of 7				-
	Collection, Page 3 of 7				-
	Collection, Page 4 of 7				-
	Collection, Page 5 of 7				-
	Collection, Page 6 of 7				-
	Collection, Page 7 of 7				-
		Carried to Summary			-

MINISTRY OF HEALTH
NATIONAL GUIDELINES FOR WASH IN HEALTHCARE FACILITIES
BILL NO. 3
DESCRIPTION: VIP LATRINE FOR MALES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(UGX)	AMOUNT(UGX)
	Preamble: The relevant drawings are MOH/WASH/VIP/02 and MOH/WASH/VIP/02A.				
	GENERAL SITE CLEARANCE				
	Clear the site of all weeds, bushes and trees. Level the site and plant grass to Engineer's satisfaction				-
D100	General site clearance	ha	0.006		-
	EARTHWORKS				
	Excavation for foundations				
	Excavate oversite to remove Top soil				
E311	Depth not exceeding 0.25m	m^3	9		-
	Excavation in material other than topsoil, rock or artificial hard material, commencing surface is the stripped ground level				
E323	Depth 0.5-1m	m^3	4		-
E325	Depth 2-5m	m^3	68		-
	Excavation Ancilliaries				
	Preparation of excavated surfaces in the following materials				
E522	Material other than topsoil, rock, or artificial hard material	m^2	60		-
	Disposal of Excavated Material				
E531	Topsoil to temporary stockpile on site for re-use	m^3	10		-
E532	Disposal of excavated material other than topsoil, rock or artificial hard material to	m^3	65		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Filling				
E613	Filling to structures in non selected excavated material other than top soil or rock	m^3	10.0		-
E647	150mm thick bed of approved imported hardcore well spread, leveled, rammed to consolidation on stabilized and compacted ground with blinding to Engineer's satisfaction	m^2	62		-
	Filling Ancillaries				
	Preparation of filled surfaces				
E722	50mm sand blinding layer of compacted sand to compated hardcore well watered and rolled to receive concrete	m^2	62		-
	IN-SITU CONCRETE				-
	Provision of Concrete				
	Designed Mix Concrete				
	Grade C15				
	Designed mix, grade C15 concrete, to BS 5328, with ordinary portland cement to BS 12, aggregate to BS 882, for the following aggregate sizes				
F233	20mm aggregate	m^3	18.0		-
	Grade C20				
	Designed mix, grade C20 concrete, to BS 5328, with ordinary portland cement to BS 12, 20mm aggregate to BS 882, for the following;				
F243.1	Plain concrete C20/20 to strip foundations, 150mm thick on firm ground and 100mm ground slab on hardcore and wall plinth	m^3	8.00		-
F253.1	Reinforced concrete grade C25/20 to ground beam and ring beam	m^3	4		-
F243.3	Splash apron, 150mm thick on blinded hardbore	m^3	3		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Grade C25				
	Designed mix, grade C25 concrete, to BS 5328, with ordinary portland cement to BS 12, 20mm aggregate to BS 882, for the following;				
F253.1	Reinforced concrete to the ground beam	m^3	1.50		-
F253.2	Reinforced concrete to the ring beam	m^3	1.50		-
	Placing Mass Concrete				
					-
	Blinding				
	Placing blinding concrete, grade C15, of the following thickness				
					-
F511	Thickness not exceeding 150mm	m^3	18.00		-
	Plain concrete				
	Placing mass concrete, grade C20 for bases, footings and ground slabs of the following thicknesses				
F521	Thickness not exceeding 150mm	m^3	11.00		-
					-
	Placing Reinforced Concrete				
	Placing reinforced concrete, grade C20 for Ground slabs of the following thicknesses				
					-
F621	Thickness not exceeding 150mm	m^3	4.00		-
					-
	Placing reinforced concrete, grade C25 for beams of the following cross-sectional areas				-
					-
F661	Cross-sectional area not exceeding 0.03 m^2	m^3	3.00		-
	CONCRETE ANCILLARIES				
	Formwork				
	Fair finish formwork in horizontal plane of the following width				
G215	Width exceeding 1.22m	m^2	18		-
	Fair finish formwork in vertical plane of the following width				-
					-
G242	Width 0.1-0.2m	m	66		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Reinforcement				
	Plain rounded steel bars to BS4449 and of the following sizes				
G512	Nominal size, 8mm	t	0.04		-
	Deformed high yield steel bars to BS4449 and of the following sizes				-
G524	Nominal size, 6mm-12mm	t	0.2		-
G567	Steel fabric reinforcement to BS4483 , fabric A252	m^2	30		-
	Concrete Accessories				-
G811	Finishing of top surfaces with wood float	m^2	30		-
	BRICKWORK, BLOCKWORK AND MASONRY				-
U121	230mm thick walls in well burnt clay bricks bedded and jointed in 1:3 cement sand mortar with 25 x 1.5mm thick metal strip at every third coarse.	m^2	201		-
	PAINTING				-
	High Gloss Oil Paint				-
V326	External quality high gloss oil paint, two coats, to facia board include surface preparation and undercoat	m	25		-
V333	External quality high gloss oil paint, two coats, to smooth concrete surfaces; include surface preparation as specified	m²	6		-
	Emulsion Paint				-
V567.1	Internal quality vinyl silk emulsion paint , under coat & two overcoats, to interior brick work wall surfaces to the Engineer's satisfaction, include surface preparation as specified	m²	182		-
V567.2	Exterior quality weather guard paint , under coat & two overcoats, to rendered brick work wall surfaces to the Engineer's satisfaction, include surface preparation as specified	m²	85		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	WATER PROOFING				
	Damp Proofing				
	Damp proof course of bitumen impregnated fabric to BS 6398 for the following wall thicknesses				-
W116	Bituminous felt horizontal damp proof course 230mm wide under walling with 200mm overlaps at joints	m	62		-
	Rendering				-
					-
W153.1	1:4 cement- screed plaster externally to walls 25mm thick and finish with wooden float and roughcast to engineer's satisfaction	m²	85		-
					-
W153.2	1:4 cement- screed plaster internally to walls 25mm thick and finish smooth with steel float to enginee's satisfaction	m²	182		-
	Roofing				-
					-
W321	Construct roofing, complete as in the drawings and as specified; with galvanised blue factory pre-painted profiled iron sheets, gauge 28, complete with purlins, rafters, wall plate, 225x25mm facia board with wood protection coat, and uPVC rain water guttering and drainage feeding the rain water harvesting tank all to the Engineer's satisfaction	m²	52		-
	Protective Layers				-
W441.2	1:3 cement sand mortar 25mm thick floor screed finished to hard and smooth surface with a steel float using cement grout	m²	33		-
W441.2	Terrazo floor finish	m²	33		-
W446	20 x 100mm high skirting with rounded top edge and covered junction with paving	m	43		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Windows, Doors and Glazing				
	Windows				
					-
	Supply and fix mild steel casement glazed windows (including vents), side hung opening out constructed from standard steel sections primed with Redoxide paint before delivery to site complete with all necessary iron mongery and plugging and fixing to head jamb and cill including 3 coats of appropriate paint after installation of the following sizes				-
					-
Z321.1	500 x 650 mm high with 4mm thick transluscent glass to Engineer's Approval	nr	1		-
					-
	Doors				-
	Supply and fix mild steel casement panelled doors (including vents), side hung opening out constructed from standard steel sections primed with Redoxide paint before delivery to site complete with all necessary iron mongery and plugging and fixing to head jamb and cill including 3 coats of appropriate paint after installation of the following sizes				-
					-
Z323.1	Single leaf mild steel casement panelled door size 800 x 2080mm high including a door frame made of 150x50mm steel material to Engineer's Satisfaction	nr	5		-
					-
Z323.2	Single leaf mild steel casement panelled door size 1000 x 2080mm high including a door frame made of 150x50mm steel material to Engineer's Satisfaction	nr	1		-
					-
Z323.3	Single leaf mild steel casement panelled door size 1200 x 2075mm high including a door frame made of 150x50mm steel material to Engineer's Satisfaction	nr	1		-
					-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	MISCELLANEOUS WORKS				-
	Sanitary Fittings				
	Supply and Fix the following sanitary appliances all to Engineer's satisfaction				
X900.1	Vitreous UK White glazed wash hand basin size 550x400mm complete with 1no. 13mm diameter chromium plated pillar tap, 32mm waste outlet grating, plastic plug and chain stay, plastic bottle trap, concealed cast iron fixing brackets, jointing and water connection	nr	2		-
X900.2	Supply and Install 1000 ($1m^3$) polyethylene rain harvesting tank from crestank, including 1m concrete plinth above ground level, complete with tap for hand washing and overflow to the Engineer's satisfaction	Sum	1		-
X900.3	Supply and Install OD110mm uPVC vent pipes	m	11		-
	Inspection Chamber				
X900.4	Construct a 600mm x 450mm x 900mm deep inspection chamber in 230mm thick well burnt clay brickwork, bedded and jointed in cement and sand (1:3) mortar, walls finished with 20mm cement, lime and sand (1:2:9) plaster in two coats steel trowelled hard and smooth on walls internally.	LS	1		-
X900.5	Supply and install a reinforced concrete cover of size 650mm x 500mm x 50mm	nr	1		
	Anti-Termite Treatment				
	Provide Anti-Termite treatment to the following surfaces				-
X900.6	Sides and bottoms of foundations	m^2	56		-
X900.7	Stripped surfaces of ground	m^2	40		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	COLLECTION				
	Collection, Page 1 of 7				-
	Collection, Page 2 of 7				-
	Collection, Page 3 of 7				-
	Collection, Page 4 of 7				-
	Collection, Page 5 of 7				-
	Collection, Page 6 of 7				-
	Collection, Page 7 of 7				-
		Carried to Summary			-

MINISTRY OF HEALTH
NATIONAL GUIDELINES FOR WASH IN HEALTHCARE FACILITIES
BILL NO. 4
DESCRIPTION: SEPTIC TANK AND SOAK AWAY PIT

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(UGX)	AMOUNT(UGX)
	Preamble: The relevant drawings are MOH/WASH/ST/01 and MOH/WASH/SAP/01				
A	**SOAK PIT**				
	Provide and construct soak pit size 1500mm diameter by 2500mm depth, Hardcore filling & selected fill in 150mm layers well rammed and consolidated on 1000 guage polythene sheeting	No.	1		-
B	**SEPTIC TANK**				-
	Excavate for and construct 45 users Septic Tank over all size 6240mmx 2080mm with a partition wall dividing it into two chambers first of 4160mmx2080mm depth to invert level(average) 1250mm and second chamber of 2080mm x2080mm width to invert level(average) 1250mm.Built in 240mm thick concrete block walling in 1:4 cement mortar walls plastered inside with approved water proofing additive in two coats:125mm thick concrete mix(1:3:6-20mm aggregate) base: 150mm thick top reinforced concrete slab of grade 25/20 with two 610mmx450mm rebate openings and double seal cast iron covers. Rate to including all accesories as per drawing details.	No.	1		-
					-
					-
					-
					-
					-
					-
					-
					-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	COLLECTION				
	Collection, Page 1 of 1				-
		Carried to Summary			-

MINISTRY OF HEALTH
NATIONAL GUIDELINES FOR WASH IN HEALTHCARE FACILITIES
BILL NO.5
DESCRIPTION: SOLID WASTE COLECTION BUNKER

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(UGX)	AMOUNT(UGX)
	Preamble: The relevant drawings are MOH/WASH/SWCB/01				
	GENERAL SITE CLEARANCE				
	Clear the site of all weeds, bushes and trees. Level the site and plant grass to Engineer's satisfaction				-
D100	General site clearance	ha	0.002		-
	EARTHWORKS				
	Excavation for foundations				
	Excavate oversite to remove Top soil				
E311	Depth not exceeding 0.25m	m^3	3		-
	Excavation in material other than topsoil, rock or artificial hard material, commencing surface is the stripped ground level				
E323	Depth 0.5-1m	m^3	4		-
	Excavation Ancilliaries				
	Preparation of excavated surfaces in the following materials				
E522	Material other than topsoil, rock, or artificial hard material	m^2	18		-
	Disposal of Excavated Material				
E531	Topsoil to temporary stockpile on site for re-use	m^3	3		-
E532	Disposal of excavated material other than topsoil, rock or artificial hard material to	m^3	3.6		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Filling				
E613	Filling to structures in non selected excavated material other than top soil or rock	m^3	2.3		-
E647	150mm thick bed of approved imported hardcore well spread, leveled, rammed to consolidation on stabilized and compacted ground with blinding to Engineer's satisfaction	m^2	19		-
	Filling Ancillaries				
	Preparation of filled surfaces				
E722	50mm sand blinding layer of compacted sand to compated hardcore well watered and rolled to receive concrete	m^2	19		-
	IN-SITU CONCRETE				-
	Provision of Concrete				
	Designed Mix Concrete				
	Grade C15				
	Designed mix, grade C15 concrete, to BS 5328, with ordinary portland cement to BS 12, aggregate to BS 882, for the following aggregate sizes				
F233.1	20mm aggregate	m^3	3.6		-
F233.2	Splash apron, 150mm thick on blinded hardbore	m^3	1.0		-
	Placing Mass Concrete				
	Plain concrete				-
	Placing mass concrete, grade C20 for bases, footings and ground slabs of the following thicknesses				
F522	Thickness: 150-300mm	m^3	4.60		- -
	CONCRETE ANCILLARIES				
	Formwork Fair finish formwork in vertical plane of the following width				-
G242	Width 0.1-0.2m	m	16		- -
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Reinforcement				
G561	Steel fabric reinforcement to BS4483, fabric A98	m^2	14		-
	Concrete Accessories				-
G811	Finishing of top surfaces with wood float	m^2	14		-
	BRICKWORK, BLOCKWORK AND MASONRY				-
U121	230mm thick walls in concrete blockwork bedded and jointed in 1:3 cement sand mortar with 25 x 1.5mm thick metal strip at every third coarse.	m^2	17		-
	PAINTING				
V567.2	Exterior quality weather guard paint , under coat & two overcoats, to rendered brick work wall surfaces to the Engineer's satisfaction, include surface preparation as specified	m²	14		-
	WATER PROOFING				
	Damp Proofing				
	Damp proof course of bitumen impregnated fabric to BS 6398 for the following wall thicknesses				-
W116	Bituminous felt horizontal damp proof course 230mm wide under walling with 200mm overlaps at joints	m	12		-
	Rendering				-
W153.1	1:3 cement- screed plaster externally to walls 25mm thick and finish with wooden float and roughcast to engineer's satisfaction	m²	14		-
W153.2	1:3 cement- screed plaster internally to walls 25mm thick and finish smooth with steel float to enginee's satisfaction	m²	14		-
	Protective Layers				-
W441.2	1:3 cement sand mortar 25mm thick floor screed finished to hard and smooth surface with a steel float using cement grout	m²	33		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	COLLECTION				
	Collection, Page 1 of 3				-
	Collection, Page 2 of 3				-
	Collection, Page 3 of 3				-
		Carried to Summary			-

MINISTRY OF HEALTH
NATIONAL GUIDELINES FOR WASH IN HEALTHCARE FACILITIES
BILL NO.6
DESCRIPTION: PLACENTA PIT

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(UGX)	AMOUNT(UGX)
	Preamble: The relevant drawings are MOH/WASH/PP/01				
	GENERAL SITE CLEARANCE				
	Clear the site of all weeds, bushes and trees. Level the site and plant grass to Engineer's satisfaction				-
D100	General site clearance	ha	0.001		-
	EARTHWORKS				
	Excavation for foundations				
	Excavate oversite to remove Top soil				
E311	Depth not exceeding 0.25m	m^3	2.2		-
	Excavation in material other than topsoil, rock or artificial hard material, commencing surface is the stripped ground level				
E325	Depth 2-5m	m^3	26.2		-
	Excavation Ancilliaries				
	Preparation of excavated surfaces in the following materials				
E522	Material other than topsoil, rock, or artificial hard material	m^2	34		-
	Disposal of Excavated Material				
E531	Topsoil to temporary stockpile on site for re-use	m^3	2.2		-
E532	Disposal of excavated material other than topsoil, rock or artificial hard material to	m^3	23.58		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Filling				
E613	Filling to structures in non selected excavated material other than top soil or rock	m^3	2.0		-
E647	100mm thick bed of approved imported hardcore well spread, leveled, rammed to consolidation on stabilized and compacted ground with blinding to Engineer's satisfaction	m^2	2.5		-
	Filling Ancillaries				
	Preparation of filled surfaces				
E722	50mm sand blinding layer of compacted sand to compated hardcore well watered and rolled	m^2	2.5		-
	IN-SITU CONCRETE				-
	Provision of Concrete				
	Designed Mix Concrete				
	Grade C20				
	Designed mix, grade C20 concrete, to BS 5328, with ordinary portland cement to BS 12, aggregate to BS 882, for the following aggregate sizes				
F243.1	20mm aggregate	m^3	2.5		-
	Placing Mass Concrete				-
	Plain concrete				
	Placing mass concrete, grade C20 for bases, footings and ground slabs of the following thicknesses				-
F522	Thickness: 150-300mm	m^3	1.20		-
	Placing Reinforced Concrete				
	Placing reinforced concrete, grade C20 for Ground slabs of the following thicknesses				-
F621	Thickness not exceeding 150mm	m^3	1.40		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	CONCRETE ANCILLARIES				
	Formwork				
	Fair finish formwork in vertical plane of the following width				-
					-
G242	Width 0.1-0.2m	m	11.2		-
	Reinforcement				
	Plain rounded steel bars to BS4449 and of the following sizes				
G512	Nominal size, 8mm	t	0.03		-
					-
	Deformed high yield steel bars to BS4449 and of the following sizes				-
					-
G524	Nominal size, 6mm-12mm	t	0.4		-
G561	Steel fabric reinforcement to BS4483, fabric A98	m^2	6.5		-
	Concrete Accessories				-
					-
G811	Finishing of top surfaces with wood float	m^2	6.5		-
	BRICKWORK, BLOCKWORK AND MASONRY				-
					-
U121	230mm thick walls in concrete blockwork bedded and jointed in 1:3 cement sand mortar with 25 x 1.5mm thick metal strip at every third coarse.	m^2	33.4		-
	PAINTING				
V567.2	Exterior quality weather guard paint , under coat & two overcoats, to rendered brick work wall surfaces to the Engineer's satisfaction, include surface preparation as specified	m²	17		-
	WATER PROOFING				
	Damp Proofing				
	Damp proof course of bitumen impregnated fabric to BS 6398 for the following wall thicknesses				
W116	Bituminous felt horizontal damp proof course 230mm wide under walling with 200mm overlaps at joints	m	22		-
			Carried to Collection		-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	Rendering				
W153.1	1:4 cement- screed plaster externally to walls 25mm thick and finish with wooden float and roughcast to engineer's satisfaction	m²	8.4		-
					-
W153.2	1:3 cement- screed plaster internally to walls 25mm thick and finish smooth with steel float to enginee's satisfaction	m²	33.4		-
	Protective Layers				-
W441.2	1:3 cement sand mortar 25mm thick floor screed finished to hard and smooth surface with a steel float using cement grout	m²	9.0		-
	Windows, Doors and Glazing				
	Doors				-
	Supply and fix mild steel casement panelled doors , side hung opening out constructed from standard steel sections primed with Redoxide paint before delivery to site complete with all necessary iron mongery and plugging and fixing to head jamb and cill including 3 coats of appropriate paint after installation of the following sizes				
Z323.1	Single leaf mild steel casement panelled door size 800 x 2000mm high including a door frame made of 150x50mm steel material to Engineer's Satisfaction	nr	1		-
	MISCELLANEOUS WORKS				
X900.1	Supply and Install OD110mm uPVC vent pipes	m	3		-
					-
X900.2	Supply and install a 860mm x 660mm x 50mm hinged chequered steel plate cover airtight with padlock provision.	nr	1		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	COLLECTION				
	Collection, Page 1 of 4				-
	Collection, Page 2 of 4				-
	Collection, Page 3 of 4				-
	Collection, Page 4 of 4				-
		Carried to Summary			-

MINISTRY OF HEALTH
NATIONAL GUIDELINES FOR WASH IN HEALTHCARE FACILITIES
BILL NO. 2
DESCRIPTION: 2 STANCE BATH SHELTER

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(UGX)	AMOUNT(UGX)
	Preamble: The relevant drawings are MOH/WASH/BS/01 and MOH/WASH/BS/02.				
	GENERAL SITE CLEARANCE				
	Clear the site of all weeds, bushes and trees. Level the site and plant grass to Engineer's satisfaction				-
D100	General site clearance	ha	0.00156		-
	EARTHWORKS				
	Excavation for foundations				
	Excavate oversite to remove Top soil				
E311	Depth not exceeding 0.25m	m^3	4		-
	Excavation in material other than topsoil, rock or artificial hard material, commencing surface is the stripped ground level				
E323	Depth 0.5-1m	m^3	6		-
	Excavation Ancilliaries				
	Preparation of excavated surfaces in the following materials				
E522	Material other than topsoil, rock, or artificial hard material	m^2	24		-
	Disposal of Excavated Material				
E531	Topsoil to temporary stockpile on site for re-use	m^3	4		-
E532	Disposal of excavated material other than topsoil, rock or artificial hard material to sites as specified and as directed by the Engineer	m^3	21.6		-
	Filling				
E613	Filling to structures in non selected excavated material other than top soil or rock	m^3	2.6		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
E647	150mm thick bed of approved imported hardcore well spread, leveled, rammed to consolidation on stabilized and compacted ground with blinding to Engineer's satisfaction	m^2	7		-
	Filling Ancillaries				
	Preparation of filled surfaces				
E722	50mm sand blinding layer of compacted sand to compated hardcore well watered and rolled to receive concrete	m^2	7		-
	IN-SITU CONCRETE				-
	Provision of Concrete				
	Designed Mix Concrete				
	Grade C25				
	Designed mix, grade C25 concrete, to BS 5328, with ordinary portland cement to BS 12, 20mm aggregate to BS 882, for the following;				
F253.1	Plain concrete C25/20 to strip foundations, 200mm thick on firm ground and 100mm ground slab on hardcore and wall plinth	m^3	4.00		-
F253.2	Reinforced concrete grade C25/20 to lintel	m^3	0.21		-
	Placing Mass Concrete				
	Plain concrete				
	Placing mass concrete, grade C25 for bases, footings and ground slabs of the following thicknesses				
F522	150-300mm	m^3	4.00		-
	Placing Reinforced Concrete				
	Placing reinforced concrete, grade C25 for beams and lintels of the following cross-sectional areas				-
F662	Cross-sectional area not exceeding 0.03-0.1 m^2	m^3	0.21		-
				Carried to Collection	-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	CONCRETE ANCILLARIES				
	Formwork				
	Fair finish formwork in horizontal plane of the following width				
G215	Width exceeding 1.22m	m^2	1		-
	Fair finish formwork in vertical plane of the following width				-
G242	Width 0.1-0.2m	m	10		-
	Reinforcement				
	Deformed high yield steel bars to BS4449 and of the following sizes				-
G524	Nominal size, 6mm-12mm	t	0.042		-
G567	Steel fabric reinforcement to BS4483 , fabric A98	m^2	15		-
	Concrete Accessories				-
G811	Finishing of top surfaces with wood float	m^2	15		-
	BRICKWORK, BLOCKWORK AND MASONRY				-
U121.1	150mm thick walls in well burnt clay bricks bedded and jointed in 1:3 cement sand mortar with 25 x 1.5mm thick metal strip at every third coarse.	m^2	48		-
U121.2	230mm thick walls in well burnt clay bricks bedded and jointed in 1:3 cement sand mortar with 25 x 1.5mm thick metal strip at every third coarse.	m^2	7.00		-
	PAINTING				-
	High Gloss Oil Paint				-
V326	External quality high gloss oil paint, two coats, to facia board include surface preparation and undercoat	m	16		-
	Emulsion Paint				-
V567.1	Internal quality vinyl silk emulsion paint , under coat & two overcoats, to interior brick work wall surfaces to the Engineer's satisfaction, include surface preparation as specified	m^2	22		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
V567.2	Exterior quality weather guard paint , under coat & two overcoats, to rendered brick work wall surfaces to the Engineer's satisfaction, include surface preparation as specified	m²	42		-
	WATER PROOFING				
	Damp Proofing				
	Damp proof course of bitumen impregnated fabric to BS 6398 for the following wall thicknesses				
W116	Bituminous felt horizontal damp proof course 230mm wide under walling with 200mm overlaps at joints	m	16		-
					-
	Rendering				-
					-
W153.1	1:4 cement- screed plaster externally to walls 25mm thick and finish with wooden float and roughcast to engineer's satisfaction	m²	42		-
					-
W153.2	1:4 cement- screed plaster internally to walls 25mm thick and finish smooth with steel float to enginee's satisfaction	m²	48		-
					-
	Roofing				-
					-
W321	Construct roofing, complete as in the drawings and as specified; with galvanised blue factory pre-painted profiled iron sheets, gauge 28, complete with purlins, rafters, wall plate, 225x25mm facia board with wood protection coat, and uPVC rain water guttering and drainage feeding the rain water harvesting tank all to the Engineer's satisfaction	m²	16		-
	Protective Layers				-
W421	Flexible polyethylene sheeting, gauge 1000, or similar approved, laid to the surface of blinding concrete or sand blinded hardcore fill	m²	9.2		-
W441	1:3 cement sand mortar 25mm thick floor screed finished to hard and smooth surface with a steel float using cement grout	m²	9.2		-
					-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
W457	Supply and Fix ceramic tiles to all floors and internal walls (2000mm high skirting) of the bathroom and finish joints with white cement grout to Engineer's Satisfaction	m²	42		-
	Windows, Doors and Glazing				
	Doors				-
	Supply and fix mild steel casement panelled doors (including vents), side hung opening out constructed from standard steel sections primed with Redoxide paint before delivery to site complete with all necessary iron mongery and plugging and fixing to head jamb and cill including 3 coats of appropriate paint after installation of the following sizes				-
					-
Z323	Single leaf mild steel casement panelled door size 800 x 2000mm high including a door frame made of 150x50mm steel material to Engineer's Satisfaction	nr	2		-
					-
	MISCELLANEOUS WORKS				-
					-
	Sanitary Fittings				-
					-
	Supply and Fix the following sanitary appliances all to Engineer's satisfaction				-
					-
X900.1	Shower head and gate valve, tap and all the associated piping and accessories	nr	2		-
X900.2	Tap	nr	2		-
X900.3	Wall hanging rack	nr	2		-
	Manhole chamber				
X900.4	Gulley trap complete with precast concrete cover	nr	1		-
					-
	Soakaway pit				-
					-
X900.5	Construct a 1.5 diameter by 2m deep soakaway pit for grey water from the bathroom, complete with sewer pipeline as specified and to the Engineers approval	nr	1		-
		Carried to Collection			-

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	RATE(USD)	AMOUNT(USD)
	COLLECTION				
	Collection, Page 1 of 5				-
	Collection, Page 2 of 5				-
	Collection, Page 3 of 5				-
	Collection, Page 4 of 5				-
	Collection, Page 5 of 5				-
		Carried to Summary			-

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