

# NATIONAL OCCUPATIONAL STANDARD FOR WASTEWATER AND FAECAL SLUDGE TREATMENT PLANT OPERATOR



**NOS.WFSTPO.01  
FIRST EDITION**

## APPROVING AUTHORITY

This National Occupational Standard (NOS) has been prepared and published under the authority of the Zambia Qualifications Authority Board on 16<sup>th</sup> May, 2024.

## ZAMBIA QUALIFICATIONS AUTHORITY

The Zambia Qualifications Authority (ZAQA) Act No. 13 of 2011 was enacted by the Government of the Republic of Zambia to ***“provide for the development and implementation of a national qualifications framework; establish the Zambia Qualifications Authority; provide for the registration and accreditation of qualifications; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing”***. Among other functions, ZAQA is responsible for ***determining national standards for any occupation***, through the various sector specific National Occupational Standards Development Teams (NOSDTs).

## REVISION OF NATIONAL OCCUPATIONAL STANDARDS

National Occupational Standards (NOS) shall be revised every 5 years, or whenever it is deemed necessary, by the issuance of either amendments or revised editions. It is important that users of the NOS ascertain that they are in possession of the latest amendments or editions.

## NOS DEVELOPMENT TEAM RESPONSIBLE

This National Occupational Standard was prepared by the Water NOSDT, upon which the following organisations were represented:

1. Technical Education Vocational and Entrepreneurship Training Authority (TEVETA) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Thrive Project
2. Habitat for Humanity Zambia (HHZ)
3. Living Water International (LWI)
4. Ministry of Water Development and Sanitation (MWDS)
5. National Water Supply and Sanitation Council (NWASCO) / Lusaka Water Security Initiative (LuWSI)
6. Natural Resources Development College (NRDC)
7. The Copperbelt University (CBU)
8. The University of Zambia (UNZA)
9. Water Resources Management Authority (WARMA)
10. WaterAid Zambia (WAZ)
11. Zambia Environmental Management Agency (ZEMA)

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## FOREWORD

The Zambia Qualifications Authority (ZAQA) is a statutory body under the Ministry of Education established by ZAQA Act No. 13 of 2011 to ***“provide for the development and implementation of a national qualifications framework; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing”***.

Among other functions, ZAQA is responsible for ***“determining national standards for any occupation”***, through the various sector specific National Occupational Standards Development Teams (NOSDTs) with experts composed of representation from the appropriate authorities, government departments, consumer associations, regulators, industry, academia, and non-governmental organisations, etc.

This National Occupational Standard (NOS) has been developed by the Water National Occupational Standards Development Team in accordance with the laid down procedures and guidelines of ZAQA. All users should ensure that they have the latest edition of this publication as the NOS are revised from time to time.

This NOS shall be used by, among others, industry, employers, quality assurance bodies, awarding and professional bodies, and education and training institutions, as a benchmark to identify training needs, develop job profiles/descriptions, develop curricula, and learning programmes in various sectors where the occupation exists. In the Water sector, demonstration of competence against this NOS may be required in order to run a business or practice a craft or profession.

## JUSTIFICATION

Wastewater and Faecal Sludge Treatment Plant Operators (Treatment Plant Operators) ensure proper treatment of wastewater and faecal sludge. They play a crucial role in protecting ecosystems, water bodies, and the overall environment. Wastewater and faecal sludge contain harmful pathogens and chemicals that if left untreated can pose a threat to public health. Treatment Plant Operators ensure that wastewater and faecal sludge undergo rigorous treatment processes, effectively removing or neutralising harmful substances, thus preventing the spread of waterborne diseases and protecting public health.

Treatment Plant Operators maintain compliance with regulations, which include discharge limits for pollutants and effluent quality standards, ensuring the treated wastewater and faecal sludge meet all necessary regulatory requirements. In many cases, treated wastewater and faecal sludge can be safely recycled and reused for various purposes, such as irrigation, industrial processes or replenishing water sources. Treatment Plant Operators also play a crucial role in ensuring the treated wastewater and faecal sludge meet the necessary quality standards for the specific reuse applications.

Treatment Plant Operators strive to minimise the volume of waste generated during the treatment process. By implementing efficient treatment techniques, optimising

processes, and promoting resource recovery, they contribute to waste reduction, environmental sustainability, and cost-effectiveness. During emergency situations, like heavy rains, floods or pipe leaks, they are essential in responding promptly to prevent system failures, and mitigate the potential risks of untreated wastewater and faecal sludge discharge. They implement contingency plans, monitor systems, and take necessary actions to safeguard public health and the environment.

Wastewater and faecal sludge treatment plants require continuous monitoring, maintenance, and adjustment, to ensure optimal performance and efficiency. Treatment Plant Operators are responsible for regular inspections of equipment, conducting tests, analysing data, and making adjustments to treatment processes for the effective removal of pollutants and maintaining smooth operation of the plant. They can educate the public about the importance of properly disposing of waste, avoiding the introduction of harmful substances into the wastewater and faecal sludge systems, and understanding the benefits of wastewater and faecal sludge treatment. Their role in community outreach contributes to public awareness and behavioural change regarding wastewater and faecal sludge management.

The position of a Wastewater and Faecal Sludge Treatment Plant Operator is crucial for environmental protection, public health, regulatory compliance, emergency response, and waste minimisation. Their work ensures safe and effective treatment of wastewater and faecal sludge, protecting ecosystems, preventing pollution, and promoting sustainability.

This NOS highlights the core knowledge, skills, competences, and personal attributes that Wastewater and Faecal Sludge Treatment Plant Operators must possess to be successful in their jobs.

## ACRONYMS AND ABBREVIATIONS

CS	Core Skills
K	Knowledge and Understanding
NOS	National Occupational Standard
NOSDT	National Occupational Standards Development Team
OSHE	Occupational Safety, Health and Environment
OK	Organisational Knowledge
PC	Performance Criteria
pH	Hydrogen Potential
PS	Professional Skills
RPL	Recognition of Prior Learning
SCADA	Supervisory Control and Data Acquisition
SOP	Standard Operating Procedure
TK	Technical Knowledge
TPO	Treatment Plant Operator
WFSTPO	Wastewater and Faecal Sludge Treatment Plant Operators
ZAQA	Zambia Qualifications Authority
ZQF	Zambia Qualifications Framework

## GLOSSARY OF TERMS

For the purposes of this NOS, the following terms and definitions shall apply:

**Core Skills/Generic Skills:** are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable to most job roles.

**Disability:** is the physical or mental impairment that substantially limits one or more major life activities.

**Function:** is an activity necessary for achieving the key purpose of the sector, occupation or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of the NOS.

**Job Title:** defines a unique set of functions that together form a unique employment opportunity in an organisation.

**Knowledge and Understanding:** are statements, which together specify the technical, generic, professional, and organisational specific knowledge that an individual needs in order to perform to the required standard.

**National Occupational Standards (NOS):** are statements of the standards of performance individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding. They are precise descriptions of what an individual is expected to be able to do in his/her work role.

**National Occupational Standards (NOS) Code:** is a unique reference code that identifies a NOS.

**National Occupational Standards Development Team (NOSDT):** means an established group of national stakeholders/experts responsible for the development of National Occupational Standards within a specific economic sector or occupation.

**Occupation:** is a set of job roles, which perform similar/related set of functions in an industry.

**Organisational Context:** includes the way the organisation is structured and how it operates, including the extent of operative knowledge that managers have in their relevant areas of responsibility.

**Performance Criteria:** are statements that together specify the standard of performance required when carrying out a task.

**Scope:** is the set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on the quality of performance required.



**Sector:** is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy, whose components share similar characteristics and interests.

**Sub Sector:** is derived from a further breakdown based on the characteristics and interests of its components.

**Technical Knowledge:** is the specific knowledge needed to accomplish specific designated responsibilities.

**Unit Title:** gives a clear overall statement about what the incumbent should be able to do.

**Elements:** set out competences the incumbent should possess to carry out the day-to-day activities.

## 1. OVERVIEW

This is an introductory section providing a summary and specific information or commentary about the content of the NOS, the targeted sector and occupation to help the user judge whether it is relevant to them.

<b>NOS Code</b>	<b>NOS.WFSTPO.01</b>
<b>Occupation</b>	Wastewater and Faecal Sludge Treatment Plant Operations
<b>Job Title</b>	Wastewater and Faecal Sludge Treatment Plant Plant Operator
<b>Job Description</b>	A Wastewater and Faecal Sludge Treatment Plant Operator is responsible for monitoring the operations of the treatment plant, ensuring all treatment units are functional and in good order. A Treatment Plant Operator is responsible for treatment and safe disposal of effluent in conformity with national regulations. They are also responsible for compliance to occupational and biosafety standards and guidelines within the plant.
<b>Job Purpose</b>	A Treatment Plant Operator is responsible for the treatment and safe disposal of effluent and sludge.
<b>ZQF Level</b>	6
<b>Sector</b>	Water
<b>Sub sectors</b>	Water Supply and Sanitation
<b>Other Economic Sector(s) in which the Occupation is Practiced</b>	Manufacturing, Mining, Education and Health (schools, colleges, universities, hospitals), Aviation, etc.
<b>Other Similar Jobs that can be Performed in the Occupation</b>	Maintenance Officer, Pump Operations & Repair Officer, Plant Safety Officer, Water Quality Assessment Officer, etc.
<b>Minimum Educational Job Entry Qualification(s)</b>	Diploma (Water Engineering; Water, Wastewater and Faecal Sludge Operations; Sanitation; Water Management; Civil and Environmental Engineering, etc.)
<b>Practicing License Requirements (if any)</b>	Membership with the Engineering Institution of Zambia – Technologist
<b>Training/RPL (Suggested)</b>	Experience in operating wastewater and faecal sludge treatment plants
<b>Minimum Job Entry Age</b>	20 years
<b>Prior Experience (Recommended)</b>	At least one year internship as a Wastewater and Faecal Sludge Treatment Plant Operator.
<b>Performance Criteria</b>	As described in the Units under Section 4

## **2. SCOPE**

This NOS specifies the fundamental knowledge and understanding, skills and competences, and personal attributes that Wastewater and Faecal Sludge Treatment Plant Operators must possess to be successful in their jobs.

## **3. PERSONAL ATTRIBUTES (VALUES, ETHICS AND ATTITUDES)**

This job requires ability to do basic planning and analysis; ability to manage a team; physique to sustain strenuous conditions; high technological exposure to handle various equipment, tools, and materials; sensitivity towards safety for self, others and wastewater and faecal sludge works environment whilst working at the site; be well versed with tasks, functions, standards, specifications, codes of practice, and safety norms applicable to plant operations; be honest and results oriented; etc.

## **4. UNITS AND ELEMENTS**

This National Occupational Standard is divided into 4 Units, representing the tasks that a jobholder should undertake in his/her day-to-day work. Each unit is further broken down into elements depicting the number of activities to be carried out for the successful execution of a particular task.

**UNIT 1** [This Unit covers the skills and knowledge required by a Wastewater and Faecal Sludge Treatment Plant Operator in conducting assessments of incoming effluent or faecal sludge, and characterising it with a view of determining the correct treatment method]

<b>Unit No.</b>	<b>01</b>
<b>Unit Title</b>	<b>Assessment of Incoming Effluent or Faecal Sludge to the Treatment Plant</b>
<b>Description</b>	This Unit describes the skills and knowledge required by a Treatment Plant Operator in assessing and characterising incoming effluent or faecal sludge into a treatment plant.
<b>Scope</b>	This Unit covers the following: <ul style="list-style-type: none"> <li>• Assessment of characteristics of effluent or faecal sludge.</li> </ul>
<b>Performance Criteria (PC) with respect to the Scope</b>	
<b>Element</b>	<b>Performance Criteria (PC)</b>
<b>Assessment of Characteristics of Effluent or Faecal Sludge</b>	To be competent, the individual must be able to: <p>PC1. Perform onsite tests on the effluent, e.g. pH.</p> <p>PC2. Perform visual inspections on the effluent or faecal sludge to characterise it, e.g. liquid, semi-solid, solid.</p> <p>PC3. Record volumes and types of wastewaters and faecal sludge.</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organisational Context (knowledge of the company/organisation and its processes)</b>	The individual on the job must demonstrate knowledge and understanding of: <p>OK1. Standard operating procedures for wastewater and faecal sludge treatment.</p> <p>OK2. Quality assurance procedures.</p> <p>OK3. Stores management procedures.</p> <p>OK4. Company environmental and safety processes.</p> <p>OK5. Statutory compliance requirements at the workplace.</p> <p>OK6. Procedures of conflict resolution in the workplace.</p> <p>OK7. Sludge disposal guidelines for reuse purposes.</p>
<b>B. Technical Knowledge</b>	The individual on the job must demonstrate knowledge and understanding of: <p>TK1. Characterisation of the effluent or faecal sludge.</p> <p>TK2. Correct methods for raw wastewater and faecal sludge sample collection.</p> <p>TK3. Performing wastewater and faecal sludge analyses.</p> <p>TK3. Assessing and interpreting onsite/laboratory results of wastewater and faecal sludge.</p> <p>TK4. Wastewater and faecal sludge treatment processes.</p>
<b>C. Regulatory Context (knowledge of rule and regulations)</b>	The individual on the job must demonstrate knowledge and understanding of: <p>RK1. Applicable national wastewater and faecal sludge regulations.</p> <p>RK2. Guidelines/standards on reuse of wastewater and faecal sludge.</p>

<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The individual on the job must be able to:  CS1. Write in English (at least working level), and be able to, or have the means to, give simple instructions in the local language used at the site. CS2. Prepare and provide clear and simple instructions, details, and sketches to co-workers.
	<b>Reading Skills</b>
	The individual on the job must be able to:  CS3. Read English and be able to, or have the means to, give simple instructions in the local language used at the site. CS4. Read and interpret sketches, drawings or instructions provided for the required work. CS5. Read and interpret various safety and general signage, safety rules and tags, etc., provided at the workplace, including directions for exit routes during emergencies.
<b>B. Professional Skills</b>	<b>Oral Communication (Listening and Speaking skills)</b>
	The individual on the job must be able to:  CS6. Speak in English (at least working level), and be able to, or have the means to, give simple instructions in the local language used at the site. CS7. Listen attentively and interpret communication/ instructions from the supervisor and other co-workers. CS8. Convey information clearly and concisely to co-workers
	<b>Decision-Making</b>
	The individual on the job must be able to:  PS1. Determine the correct characterisation of effluent or faecal sludge (for determination of appropriate treatment processes). PS2. Select appropriate onsite test procedures. PS3. Make decisions on whether to treat the wastewater and faecal sludge based on the wastewater and faecal sludge treatment design of the plant. PS4. Make decisions on offloading of sludge from plants for other uses based on level of treatment.
<b>B. Professional Skills</b>	<b>Plan and Organise</b>
	The individual on the job should be able to:  PS5. Plan work and organise required resources in coordination with team members and ensure a safe working environment.
	<b>Customer Centricity</b>
<b>B. Professional Skills</b>	The individual on the job should be able to:  PS6. Receive and deal with customers in a courteous manner.

	<b>Problem Solving</b>
	The individual on the job should be able to: PS7. Resolve any conflicts within the team or with customers PS8. Recognise problems and come up with solutions. PS9. Choose best methods to complete assigned tasks.
	<b>Analytical Thinking</b>
	The individual on the job should be able to: PS10. Analyse and convey to the team and carry out remedial actions. PS11. Apply domain knowledge, observations, and data to select course of action to perform tasks related to wastewater and faecal sludge treatment.
	<b>Critical Thinking</b>
	The individual on the job should be able to: PS12. Identify and deal with or report violation of any safety norms which may lead to accidents. PS13. Critically evaluate information obtained from co-workers to perform day to day activities. PS14. Assess and evaluate the resources needed against the plan of action to complete to effectively and efficiently discharge functions.

**UNIT 2** [This Unit covers the skills and knowledge required by a Wastewater and Faecal Sludge Treatment Plant Operator in the operation of a wastewater and faecal sludge treatment plant]

<b>Unit No.</b>	<b>02</b>
<b>Unit Title</b>	<b>Operating a Wastewater and Faecal Sludge Treatment Plant</b>
<b>Description</b>	This Unit describes the skills and knowledge required by a Treatment Plant Operator to operate a wastewater and faecal sludge treatment plant.
<b>Scope</b>	This Unit covers the following: <ul style="list-style-type: none"> <li>• Operation of a wastewater and faecal sludge Treatment plant from primary to secondary to tertiary treatment.</li> </ul>
<b>Performance Criteria (PC) with respect to the Scope</b>	
<b>Element</b>	<b>Performance Criteria (PC)</b>
<b>Operation of a Wastewater and Faecal Sludge Treatment Plant from Primary to Secondary to Tertiary Treatment</b>	To be competent, the individual must be able to: <p>PC1. Operate wastewater and faecal sludge or faecal sludge receiving bays.</p> <p>PC2. Operate screens for removal of coarse elements.</p> <p>PC3. Observe functionality of the comminutor.</p> <p>PC4. Operate Grit chamber and valves.</p> <p>PC5. Operate pumps, aerators, and associated equipment.</p> <p>PC6. Operate desludging valves.</p> <p>PC7. Operate aeration tanks</p> <p>PC8. Interpret and troubleshoot control panels.</p> <p>PC9. Complete documentation as required.</p> <p>PC10. Operate different valves in the system as may be necessary.</p> <p>PC11. Disinfect effluent and treated sludge prior to disposal.</p> <p>PC12. Operate sludge treatment facilities, and ensure safe disposal/ reuse in conformity with national standards.</p> <p>PC13. Interpret onsite/laboratory wastewater and faecal sludge results.</p> <p>PC14. Participate in the development or updating of standard operating procedures relating to the treatment units of the plant.</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organisational Context (knowledge of the company/ organisation and its processes)</b>	The individual on the job must demonstrate knowledge and understanding of: <p>OK1. Standard operating procedures for wastewater and faecal sludge treatment and equipment.</p> <p>OK2. Quality policies and procedures.</p> <p>OK3. Stores management procedures.</p> <p>OK4. Company environmental and safety processes.</p> <p>OK5. Statutory compliance requirements at the workplace.</p> <p>OK6. Procedures of conflict resolution in the workplace.</p> <p>OK7. Sludge disposal guidelines for reuse purposes.</p>

<p><b>B. Technical Knowledge</b></p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. Overall operations and different processes of wastewater and faecal sludge or faecal sludge treatment, including but not limited to, screening, clarification, neutralisation, absorption, oxidation/reduction, ion exchange, aeration, sludge thickening and handling, and disinfection processes.</p> <p>TK2. Working principles of different operation units in wastewater and faecal sludge or faecal sludge treatment plant.</p> <p>TK3. Classification of different types of screens, and how they are cleaned or replaced.</p> <p>TK4. Importance and need of treating wastewater and faecal sludge.</p> <p>TK5. Sludge characterisation.</p> <p>TK6. Faecal sludge handling and treatment.</p> <p>TK7. Analyses of wastewater and faecal sludge at different phases of treatment.</p> <p>TK8. Impact of effluent on receiving aquatic bodies or environment.</p>
<p><b>C. Regulatory Context (knowledge of rule and regulations)</b></p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>RK1. Applicable national wastewater and faecal sludge regulations.</p> <p>RK2. Guidelines/standards on reuse of wastewater and faecal sludge/sludge.</p> <p>RK3. Safety compliances while handling chemicals and treated sludge.</p>
<p><b>Skills (S)</b></p>	
<p><b>C. Core Skills/ Generic Skills</b></p>	<p><b>Writing Skills</b></p>
	<p>The individual on the job must be able to:</p> <p>CS1. Write in English (at least working level,) and be able to, or have the means to, give simple instructions in the local language used at the site.</p> <p>CS2. Prepare and provide clear and simple instructions, details, and sketches to co-workers.</p>
	<p><b>Reading Skills</b></p>
<p>The individual on the job must be able to:</p> <p>CS3. Read English and be able to, or have the means to, give simple instructions in the local language used at the site.</p> <p>CS4. Read and interpret sketches, drawings or instructions provided for the required work.</p> <p>CS5. Read and interpret various safety and general signage, safety rules and tags, etc., provided at the workplace, including directions for exit routes during emergencies.</p>	



	<p><b>Oral Communication (Listening and Speaking skills)</b></p> <p>The individual on the job must be able to:</p> <p>CS6. Speak in English (at least working level), and be able to, or have the means to, give simple instructions in the local language used at the site.</p> <p>CS7. Listen attentively and interpret communication/ instructions from the supervisor and other co-workers.</p> <p>CS8. Convey information clearly and concisely to co-workers</p>
<p><b>A. Professional Skills</b></p>	<p><b>Decision-Making</b></p> <p>The individual on the job must be able to:</p> <p>PS1. Follow organisational rule-based decision-making processes with regard to wastewater and faecal sludge treatment.</p> <p>PS2. Take decisions with systematic course of actions and/ or responses.</p> <p>PS3. Make decisions on the chemical dosing requirements for the wastewater and faecal sludge or faecal sludge processes.</p> <p>PS4. Make decisions on offloading of treated sludge from the plant for other uses based on level of treatment.</p>
	<p><b>Plan and Organise</b></p> <p>The individual on the job should be able to:</p> <p>PS5. Plan work and organise required resources in coordination with team members and superiors.</p> <p>PS6. Plan allocation and utilisation of resources.</p> <p>PS7. Plan operations of the wastewater and faecal sludge treatment plant.</p>
	<p><b>Customer Centricity</b></p> <p>The individual on the job should be able to:</p> <p>PS8. Receive and deal with customers in a courteous manner.</p>
	<p><b>Problem Solving</b></p> <p>The individual on the job should be able to:</p> <p>PS9. Resolve any conflicts within the team.</p> <p>PS10. Recognise problems and come up with solutions.</p> <p>PS11. Choose best methods to complete assigned tasks.</p>
	<p><b>Analytical Thinking</b></p> <p>The individual on the job should be able to:</p> <p>PS12. Analyse and convey to the superior and carry out remedial action.</p> <p>PS13. Apply domain knowledge, observations, and data to select course of action to perform tasks related to wastewater and faecal sludge or faecal sludge treatment.</p>

	<b>Critical Thinking</b>
	<p>The individual on the job should be able to:</p> <p>PS14. Identify and deal with or report violation of any safety norms which may lead to accidents.</p> <p>PS15. Critically evaluate information obtained from co-workers and supervisors to perform day to day activities.</p> <p>PS16. Assess and evaluate the resources needed against the plan of action to complete the assignment within the given timeframe.</p>

**UNIT 3** [This Unit covers the skills and knowledge required by a Wastewater and Faecal Sludge Treatment Plant Operator in monitoring and maintaining the wastewater and faecal sludge treatment plant]

<b>Unit No.</b>	<b>03</b>
<b>Unit Title</b>	<b>Monitor and Maintain the Wastewater and Faecal Sludge Treatment Plant</b>
<b>Description</b>	This Unit describes the skills and knowledge required by a Treatment Plant Operator to monitor and maintain a wastewater and faecal sludge treatment plant.
<b>Scope</b>	This Unit covers the following: <ul style="list-style-type: none"> <li>Monitoring the functionality of a wastewater and faecal sludge treatment plant.</li> <li>Maintaining the wastewater and faecal sludge treatment plant.</li> </ul>
<b>Performance Criteria (PC) with respect to the Scope</b>	
<b>Element</b>	<b>Performance Criteria (PC)</b>
<b>Monitoring the Functionality of a Wastewater and Faecal Sludge Treatment Plant</b>	To be competent, the individual must be able to: <p>PC1. Check all equipment and fill out daily activity log sheets</p> <p>PC2. Check chemical stock inventory and record daily usage.</p> <p>PC3. Visually inspect the discharge points periodically for any anomalies.</p> <p>PC4. Monitor and record all meter and gauge readings.</p> <p>PC5. Prepare and maintain the operation records.</p>
<b>Maintaining the Wastewater and Faecal Sludge Treatment Plant</b>	To be competent, the individual must be able to: <p>PC6. Participate in development of maintenance schedules for the plant.</p> <p>PC7. Participate in the development or updating of standard operating procedures and checklists relating to maintenance.</p> <p>PC8. Perform maintenance on all equipment and facilities as per schedule, and ensure records are updated and well maintained.</p> <p>PC9. Perform corrective maintenance as required, and maintain records for all such activities.</p> <p>PC10. Keep the workplace and equipment clean.</p> <p>PC11. Assist in developing estimates (materials procurement) for repair, maintenance, and construction activities in the wastewater and faecal sludge treatment plant.</p> <p>PC12. Complete documentation as required.</p> <p>PC13. Adhere to standard operations procedures.</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organisational Context (knowledge of the company/organisation)</b>	The individual on the job must demonstrate knowledge and understanding of: <p>OK1. Company policies on quality and standards, design norms, safety hazards, integrity, codes, compliance, and guidelines.</p>

<p><b>and its processes)</b></p>	<p>OK2. Maintenance of the wastewater and faecal sludge treatment plant. OK3. Company's reporting structure OK4. Various departments and responsibilities in the company. OK5. Effluent and sludge disposal guidelines.</p>
<p><b>B. Technical Knowledge</b></p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. Working principles of different components in wastewater and faecal sludge treatment. TK2. Safety compliance while handling chemicals, wastewater and faecal sludge, faecal sludge and treated sludge. TK3. Classifications of different types of filters, valves, pumps, screens, tanks, and other facilities of wastewater and faecal sludge works, and how they are cleaned or replaced when required. TK4. Maintenance requirements of different components of wastewater and faecal sludge treatment plants. TK5. Maintenance management systems. TK6. SCADA based control systems. TK7. Correct procedures of offloading faecal sludge.</p>
<p><b>C. Regulatory Context (knowledge of rules and regulations)</b></p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>RK1. Wastewater and faecal sludge analysis and effluent regulations. RK2. Guidelines and standard operating procedures relating to maintenance.</p>
<p><b>Skills (S)</b></p>	
<p><b>A. Core Skills/ Generic Skills</b></p>	<p><b>Writing Skills</b></p> <p>The individual on the job must be able to:</p> <p>CS1. Write in English (at least working level), and be able to, or have the means to, give simple instructions in the local language used at the site. CS2. Prepare and provide clear and simple instructions, details, and sketches to co-workers.</p> <p><b>Reading Skills</b></p> <p>The individual on the job must be able to:</p> <p>CS3. Read English and be able to, or have the means to, give simple instructions in the local language used at the site. CS4. Read and interpret sketches, drawings or instructions provided for the required work. CS5. Read and interpret various safety and general signage, safety rules and tags, etc., provided at the workplace, including directions for exit routes during emergencies.</p>

	<p><b>Oral Communication (Listening and Speaking skills)</b></p> <p>The individual on the job must be able to:</p> <p>CS6. Speak in English (at least working level), and be able to, or have the means to, give simple instructions in the local language used at the site.</p> <p>CS7. Listen attentively and interpret communication/ instructions from the supervisor and other co-workers.</p> <p>CS8. Convey information clearly and concisely to co-workers</p>
<p><b>B. Professional Skills</b></p>	<p><b>Decision-Making</b></p> <p>The individual on the job must be able to:</p> <p>PS1. Determine and report to the superior whether the working space is safe for operating.</p> <p>PS2. Follow organisation rule-based decision-making system</p> <p>PS3. Take decisions with systematic course of actions and/or response.</p>
	<p><b>Plan and Organise</b></p> <p>The individual on the job should be able to:</p> <p>PS4. Plan work and organise required resources in coordination with team members to meet deadlines.</p> <p>PS5. Work constructively and collaboratively with others.</p>
	<p><b>Customer Centricity</b></p> <p>The individual on the job should be able to:</p> <p>PS6. Follow code of conduct.</p> <p>PS7. Manage relationships with customers with intent on satisfying its requirements for service delivery.</p>
	<p><b>Problem Solving</b></p> <p>The individual on the job should be able to:</p> <p>PS8. Resolve any conflicts within the team or with customers.</p> <p>PS9. Choose best method to complete assigned task.</p> <p>PS10. Recognise problems and search for solutions.</p>
	<p><b>Analytical Thinking</b></p> <p>The individual on the job should be able to:</p> <p>PS11. Analyse and convey to the superior and carry out remedial action.</p> <p>PS12. Apply domain knowledge, observation, and data to select course of action to perform tasks related to wastewater and faecal sludge treatment.</p>
	<p><b>Critical Thinking</b></p> <p>The individual on the job should be able to:</p> <p>PS13. Critically evaluate information obtained from customers, supervisor, and co-workers to perform day to day activities.</p> <p>PS14. Ask questions for better understanding.</p>

**UNIT 4** [This Unit covers the skills and knowledge required by a Wastewater and Faecal Sludge Treatment Plant Operator in maintaining health and safety at treatment plant]

<b>Unit No.</b>	<b>04</b>
<b>Unit Title</b>	<b>Maintenance of Health and Safety at the Treatment Plant</b>
<b>Description</b>	This Unit describes the skills and knowledge required by a Treatment Plant Operator to maintain health and safety at a treatment plant.
<b>Scope</b>	<p>This Unit covers the following:</p> <ul style="list-style-type: none"> <li>• Work safety at a wastewater and faecal sludge treatment plant.</li> <li>• Render appropriate emergency procedures to be applied.</li> </ul>
<b>Performance Criteria (PC) with respect to the Scope</b>	
<b>Element</b>	<b>Performance Criteria (PC)</b>
<b>Work Safety at a Wastewater and Faecal Sludge Treatment Plant</b>	<p>To be competent, the individual must be able to:</p> <p>PC1. Participate in the development or updating of operating procedures relating to health and safety.</p> <p>PC2. Train staff and enforce safety in the plant.</p> <p>PC3. Undertake basic safety checks before operation of machinery and vehicles, and ensure necessary precautions are taken, or all potential hazards are reported to superiors.</p> <p>PC4. Identify work for which protective clothing or equipment is required, and perform duties in accordance with the workplace policy.</p> <p>PC5. Assess risks prior to performing manual handling jobs, and work according to current recommended safety practices.</p> <p>PC6. Use equipment and materials safely and correctly, and return the same to designated storage when not in use.</p> <p>PC7. Dispose waste safely and correctly in the designated areas.</p> <p>PC8. Recognise risks to bystanders and take action to reduce risk associated with jobs in the workplace.</p> <p>PC9. Perform work in a manner that minimises environmental damage.</p> <p>PC10. Undertake regular disinfection of all facilities when required.</p> <p>PC11. Report all accidents, incidents or problems without delay to appropriate persons and take necessary remedial action to reduce further danger.</p>

<p><b>Render Appropriate Emergency Procedures to be Applied</b></p>	<p>To be competent, the individual must be able to:</p> <p>PC12. Participate in the development or updating and implementation of emergency procedures for the wastewater and faecal sludge treatment plant.</p> <p>PC13. Follow procedures for dealing with accidents, fires, and emergencies, including issuing instructions and directions for emergency evacuation.</p> <p>PC14. Follow emergency procedures to company standards/ workplace requirements.</p> <p>PC15. Use emergency equipment in accordance with manufacturers' specifications and workplace requirements.</p> <p>PC16. Provide treatment appropriate to the patients' injuries in accordance with recognised First Aid techniques.</p> <p>PC17. Recover (if practical), clean, inspect/test, refurbish, replace, and store the First Aid equipment as appropriate.</p> <p>PC18. Report details of First Aid administered in accordance with workplace procedures.</p>
<p><b>Knowledge and Understanding (K)</b></p>	
<p><b>A. Organisational Context (knowledge of the company/ organisation and its processes)</b></p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>OK1. Company health, safety, and environmental policies and procedures.</p> <p>OK2. General duties under the relevant health and safety legislations.</p> <p>OK3. Personal protective equipment to be worn and how it is cared for; correct and safe way to use materials and equipment required for the work.</p> <p>OK4. Importance of good housekeeping in the workplace.</p> <p>OK5. Safe disposal methods of waste.</p> <p>OK6. Methods for minimising environmental damage during work.</p>
<p><b>B. Technical Knowledge</b></p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. Risks to health and safety, and the measures to be taken to control them in the workplace.</p> <p>TK2. Basic emergency First Aid procedures.</p> <p>TK3. Local emergency services.</p> <p>TK4. Importance of reporting accidents, incidents, and problems, and the appropriate action to take.</p>
<p><b>C. Regulatory Context (knowledge of rules and regulations)</b></p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>RK1. Government regulatory agency requirements for health and safety.</p>



<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The individual on the job must be able to:  CS1. Mention the data required for record keeping purposes. CS2. Report problems to the appropriate personnel in a timely manner. CS3. Write descriptions and details about incidents in reports
	<b>Reading Skills</b>
	The individual on the job must be able to:  CS4. Read instruction manuals for hand tools and equipment CS5. Read and understand the hazards associated with use of chemicals and reagents as may be outlined on their labels.
	<b>Oral Communication (Listening and Speaking skills)</b>
	The individual on the job must be able to:  CS6. Communicate clearly and effectively with others, like farmers and team members; concerned stakeholders/officers. CS7. Comprehend information shared by senior staff and experts.
<b>B. Professional Skills</b>	<b>Decision-Making</b>
	The individual on the job must be able to:  PS1. Make decisions pertaining to types of tools to be used. PS2. Identify need of First Aid and render it accordingly.
	<b>Plan and Organise</b>
	The individual on the job must be able to:  PS3. Plan and organise work to meet deadlines. PS4. Work constructively and collaboratively with others.
	<b>Customer Centricity</b>
	The individual on the job must be able to:  PS5. Follow code of conduct. PS6. Manage relationships with customers with intent on satisfying their requirements for service delivery.
	<b>Problem Solving</b>
	The individual on the job must be able to:  PS7. Recognise problems and search for solutions. PS8. Choose best methods to complete assigned tasks. PS9. Approach relevant authorities when required. PS10. Judiciously use common sense in day-to-day activities.
<b>Analytical Thinking</b>	
The individual on the job must be able to:  PS11. Apply domain knowledge, observations, and data to select course of action to perform tasks.	



	<b>Critical Thinking</b>
	<p>The individual on the job must be able to:</p> <p>PS12. Critically evaluate information obtained from customers, supervisor, and co-workers to perform day to day activities.</p> <p>PS13. Ask relevant questions for better understanding.</p>

## 5. EQUIPMENT, TOOLS AND CONSUMABLE MATERIALS

Equipment, tools, and consumable materials used by the jobholder include, but are not limited to the following:

**Hand Tools:** Wrenches, spanners, hammers, pliers, shifting spanners, screw driver, sampling bottles,

**Measuring Instruments:** pH meter, flow meter, power analysers, vibration analysers, current meter, etc.

**Power Tools:** Power drive, welding machine, drilling machine, angle grinder, etc.

**Consumables and General Requirements:** Organic matter, chlorine, lime, etc.

**Personal Protective Equipment:** Safety boots, gloves, work suit, helmet, gas mask, goggles, welding shields, lab coats, aprons, etc.

**Others:** Scaffolds, ladders, computers, fire extinguishers, etc.

## 6. DILEMMAS/CHALLENGES AND COMPLEXITIES FOR A JOBHOLDER

Dilemmas associated with the job of a Wastewater and Faecal Sludge Treatment Plant Operator include: exposure to flames and electrical power supply; working around and with machinery with moving parts; working in dangerous areas with likelihood of sharp or falling materials and objects; working in confined spaces and at heights with likelihood of falls; working in extreme weather, such as hot and cold conditions; working in noisy, wet, and dusty environments; exposure to welding fumes and odours; lifting/pulling/pushing heavy materials; long working hours; pressure from supervisors and colleagues; pressure from government regulators, etc.

### 6.1 Alternative Choices (Solutions) to Dilemmas and Complexities

Solutions to dilemmas include: wearing protective clothing, and ensuring their availability and use by other employees; exercising regularly to maintain physical fitness; exercising proper work ergonomics; participating in workplace safety sensitisation and awareness meetings/training sessions; adhering to company safety and standard operating procedures at all times; consulting extensively within and outside one's department/team on water safety issues; planning and prioritising work, etc.

## 7. WORKING CONDITIONS/ENVIRONMENT

Working conditions include: indoor and outdoor water sites, as well as workshops and factories; may also work in commercial buildings or private homes; confined spaces; handling machines with moving parts; working at heights; working in conditions that may be dirty and noisy; exposure to seasonal heat and cold, or

adverse weather conditions; emergency call-outs; standing or squatting for long hours and lifting relatively heavy objects. In most cases, the job involves working normal hours, but in some instances, shift work and regular overtime may be required. The job also requires wearing suitable protective clothing, such as works suits, ear protectors, safety visors or goggles, gloves and hardhats, safety harnesses, etc.

## **8. PARTIES INVOLVED/INTERACTING WITH THE JOB HOLDER OR TRAINEE**

### **8.1 Internal – Within the Organisation**

Parties involved/interacting with the jobholder who are internal to the organisation include: supervisors/superiors, trainers, occupational health and safety teams, other colleagues, etc.

### **8.2 External – Outside the Organisation**

Parties involved/interacting with the jobholder who are external to the organisation include: government regulators, trainers, professional bodies, clients, suppliers of equipment/tools/consumables, fellow Pit Emptiers from other companies, labour unions, occupational health and safety associations, communities, etc.

## **9. PHYSICAL DEMANDS ON THE BODY**

- Ability to sustain strenuous conditions such as climbing heights.
- Walking and standing for long periods of time.
- Bending, stretching, twisting or reaching out.
- Lifting, carrying, pushing, and pulling heavy objects.
- Using fingers, hands, and feet with ease to complete the assigned task (dexterity).
- Strenuous works that may cause musculoskeletal disorders;
- Etc.

## **ANNEX A**

### **Criteria for Assessments based on this NOS**

#### **A.1 Guidelines for Assessment**

**A.1.1** Criteria for assessment for curricula and learning programmes based on this NOS will be created by curricula and programme developers, and each Performance Criteria (PC) will be assigned marks proportional to its importance in the NOS. Curricula and programme developers will also lay down proportion of marks for theory and practical skills for each performance criteria, giving more weight to practical skills.

There shall be allocated 'Total Marks', which will be the sum of all marks in each Unit, distributed across the number of PCs in that particular Unit. The 'Out of' mark will be the mark allocated to each PC, which will be shared between theory and skills practical assessments.

**A.1.2** Individual awarding/assessment bodies, or institutions and other users of the NOS, will create unique question papers for the theory part and evaluations for the skill practical part for their respective candidates.

## ANNEX B NOS Version Control

This Annex gives details necessary for the tracking of the NOS versions based on the number of revisions.

<b>NOS Code</b>	<b>NOS.WFSTPO.01</b>		
<b>ZQF Level</b>	6	<b>Version Number</b>	01
<b>Sector</b>	Water	<b>Date of Approval</b>	May 2024
<b>Sub Sector</b>	Water Supply and Sanitation	<b>Date of Last Review</b>	N/A
<b>Occupation</b>	Wastewater and Faecal Sludge Treatment Plant Operations	<b>Date of Next Review</b>	May 2029

*“You learn,  
We Standardise”*

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