DEPARTMENT OF WATER AND SANITATION

NO. 4246 **12 January 2024**

WATER SERVICES ACT, 1997

PROPOSED COMPULSORY NATIONAL WATER AND SANITATION SERVICES NORMS AND STANDARDS

The Minister of Water and Sanitation, under section 9(1) of the Water Services Act, 1997 (Act No. 108 of 1997), intends to make the regulations in the Schedule.

Interested persons are hereby invited to submit, within 60 days from the date of publication of this Notice, written comments or representations on the proposed regulations to the Director-General, Department of Water and Sanitation, Private Bag X313, Pretoria 0001; email: CommentNormsStds@dws.gov.za (For attention: Anet Muir).

MR SENZO MCHUNU, MP
MINISTER OF WATER AND SANITATION
DATE 24/11/23

SCHEDULE

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Definitions

1.(1) In these Regulations a word or expression to which a meaning has been assigned in the Act bears that meaning and, unless the context otherwise indicates:—

"asset management" means the combination of management, financial, economic, engineering, and other practices applied to physical assets with the objective of providing the required level of service in the most cost-effective manner. It includes the management of the whole life cycle (design, construction, commissioning, operating, maintaining, repairing, modifying, replacing and decommissioning/disposal) of physical and infrastructure assets.

"basic sanitation service" means the provision of a basic sanitation facility which is environmentally sustainable, easily accessible to a household and a consumer, the sustainable operation and maintenance of the facility, including the safe removal of human waste, greywater and wastewater from the premises where this is appropriate and necessary, and communication and local monitoring of good sanitation, hygiene and related practices;

"communal toilets" means toilets that are shared by a group of households in a community. In some cases, each household will have a key to one of the toilets within a block, single building or property. This may be one toilet per household, or one toilet for a group of households.

"competency" means the qualifications, experience, skills and knowledge that are required to perform a job effectively.

"drinking water" means water that is intended for human consumption; food preparation and personal hygiene with acceptable health risk compliant to SANS 241

"drinking water quality advisory notice" means either a Boil Water Notice which is issued by a Water Services Authority when the quality of drinking water poses a health risk which can be adequately addressed by additional household treatment prior to human consumption, or a Do Not Use Water Notice which is a notice issued by the Water Services Authority when the quality of drinking water poses a health risk for human consumption and food preparation which cannot be adequately mitigated by means of additional household treatment;

"effluent" means human excreta, domestic sludge, domestic wastewater, greywater or wastewater resulting from the commercial or industrial use of water that has been treated to standards issued under the National Water Act prior to discharge;

"faecal sludge" means the contents emptied from an on-site sanitation system, and not transported by sewers, including liquid and solid contents of on-site systems such as container-based vaults, pit-latrines, septic tanks, community toilets, or mobile toilets;

"faecal sludge management" means the management of faecal sludge from containments, emptying /collection, transport, treatment and disposal or reuse.

"greywater" means wastewater resulting from the use of water for domestic purposes, but does not include human excreta;

"incident" means a significant deviation in operational monitoring where a critical limit is exceeded (or in verification). An incident is any situation where there is a reason to suspect that water that is supplied for drinking maybe or may become unsafe.

"**indigent households**" households lacking the necessities of life as defined by the Indigent Policy of National Treasury

"influent " means water or wastewater flowing into a treatment works, distribution network, reservoir or treatment process;

"**informal settlement**" means residential areas that do not comply with municipal town planning scheme requirements

"interim sanitation services" means an interim measure to provide sanitary services with privacy to the user, that is safe, readily accessible and within close walking distance and provides for the safe disposal of human waste, including hygiene and end-user education;

"interim water services" means the provision of people's basic domestic needs for potable water at a minimum level through providing water at regular intervals to ensure increased opportunities for improved health;

"**ISO 31800**" means the international standards for faecal sludge treatment unit which serves 1000 to 100 000 people or 200 to 20 000 households.

"job" means the basic duties, functions, tasks, competency requirements and responsibilities according to which one or more posts of the same grade are established;

"**low density formal settlement**" means a settlement with between 1-5 units (number of households or (living) units)/ha;

"**medium density formal settlement** "means a settlement with approximately 10 units/ha

"non-compliance" means when the numerical limits prescribed in SANS 241 are not met.

"**non-revenue water**" means the volume of water supplied by the Water Services Institution, but for which it receives no income;

"non-sewered sanitation system" means a system that is not connected to a networked sewer, and collects, conveys, and fully treats the specific input to allow for safe re-use or disposal of the generated solid output or effluent;

"on-site sanitation" means a sanitation system in which excreta and wastewater are collected and stored or treated where they are generated (e.g., on the property or in the household);

"process audit" means a comprehensive assessment of designs which include structural, electrical and mechanical integrity in faecal sludge treatment plants, water- and wastewater treatment works, network and pumpstations to determine process effectiveness and adherence to design specifications.

"process condition assessment" means an assessment of the faecal sludge, water treatment or wastewater treatment process and associated infrastructure that verifies that processes are working within design specifications

"process capability assessment" means a computational method for comparing the variable output of a process to its specification limits

"sanitation safety planning" means a risk-based management tool for non-sewered or on-site sanitation systems that systematically identifies and manage health risk along the sanitation value chain.

"sanitation value chain" for on-site sanitation systems means human excreta capture, containment, emptying of the pit, containment or tank, transportation, treatment, beneficial use or safe disposal of faecal sludge;

"public place" means any open or enclosed place, park, street or thoroughfare or other similar area of land shown on a general plan or diagram which is for use by the general public and is owned by or

vests in the ownership of a municipality and includes a public open space and a servitude for any similar purpose in favour of the general public;

"SANS 241" means the South African National Standard for drinking water quality;

"SANS 10252" means the South African National Standard for water supply and drainage for buildings;

"SANS 10254" means the South African National Standard for installation of fixed electric storage water heating systems;

"**SANS 30500**" means the South African National Standard for non-sewered sanitation systems;

"supply zone" means an area, determined by a Water Services Institution, within which all the consumer connections are provided with water supply services from the same pressure zone linked to a reservoir or a direct bulk supply point with a pressure reduction value;

"the Act" means the Water Services Act, 1997 (Act No. 108 of 1997);

"the Department" means the Department of Water and Sanitation;

"the National Water Act" means the National Water Act, 1998 (Act No. 36 of 1998);

"user connection" means a connection through which a consumer can gain access to water services or connect to sanitation services and includes a consumer installation and a bulk or communal connection;

"user sector" means the applicable category of users, being users categorised into at least either—
(a) domestic;
(b) industrial; or
(c) commercial sectors;

"wastewater" means water from the commercial or industrial use of water containing waste or water that has been in contact with waste material;

"wastewater risk abatement plan" means a systematic process that aims to consistently ensure acceptable wastewater quality that does not exceed the stipulated numerical limits in licences or permits by implementing an integrated water quality management plan, which includes a risk assessment and risk management approach from wastewater collection, through treatment and discharge to the catchment;

"water conservation" means the minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water;

"water demand management" means the adaptation and implementation of a strategy and action plan by a Water Services Institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services and political acceptability;

"water efficient device" means a product that reduces the excessive use of water;

"water losses" means water that has been produced (treated by a Water Services Institution) and which is lost before it reaches the consumer. Losses can be real losses (through leaks, sometimes also referred to as physical losses) or apparent losses (for example through theft or metering inaccuracies);

"water safety plan" means a systematic process that aims to consistently ensure safe and acceptable drinking water that does not exceed the numerical limits in SANS 241 by implementing an integrated water quality management plan, which includes a risk assessment and risk management approach from catchment to consumer;

"water supply network" means a network of hydrological and hydraulic components that includes facilities for storage, transmission, treatment and distribution of water from source to consumers, for example, homes, commercial establishments, industry and public facilities.

"water supply system" means an area under jurisdiction of the Water Services Institution within which water intended for human consumption may come directly from a resource, or from one or more water treatment works.

"wastewater treatment system" means the pipes, sewers, pump stations and treatment works that collect, reticulate and treat wastewater from residents, businesses and industries before discharging or re-using the final treated effluent and biosolids;

"wastewater treatment works" means a process, or combination of processes, undertaken to render effluent acceptable to return to the environment or re use

"water treatment works" means an asset system that consists of a process, or combination of processes, undertaken to render raw water safe for drinking. A water treatment works can employ more than one process or only one process such as disinfection. Water treatment works include conventional water treatment plants, package plants groundwater treatment plants, reclamation plants and desalination plants.

PART A: PROVISION OF WATER SERVICES

Interim water services

2.(1) A Water Services Authority must take reasonable measures to provide interim water services in informal settlements.

(2) A Water Services Authority is responsible for the capital, operation, maintenance and refurbishment actions and cost pertaining to interim water services.

(3) Where permanency of an informal settlement is recognised, a Water Services Authority must ensure access to basic water services.

(4) The minimum standard for interim water services must consist of-

(a) a minimum quantity of potable water of 25 litres per person per day or a minimum of 6 kl/household per month –

(i) at a minimum flow rate of not less than 10 litres per minute;
(ii) with an effectiveness such that water is made available for at least 350 days per year; and
(iii) not interrupted for longer than 48 consecutive hours;

(b) an access or delivery point which must be a communal standpipe, within a reasonable walking distance of no more than 200m from the furthest household;

(c) water provided which complies with the requirements of SANS 241.

Basic water services

3.(1) A Water Services Authority is responsible for the provision of basic water services in its jurisdictional area.

(2) The minimum standard for basic water services must consist of -

(a) a minimum quantity of potable water of 25 litres per person per day or a minimum of 6 kl/household per month –

(i) with an effectiveness such that water is made available for at least 350 days per year, and

(ii) not interrupted for longer than 48 consecutive hours;

(iii) at no cost to indigent households

(b) an access or delivery point which must be at least at the end boundary of the property (user connection point);

(c) water provided which complies with the requirements of SANS 241.

(3) Maintenance of the infrastructure up to the user connection is the responsibility of the Water Services Institution and the maintenance of the infrastructure within the boundary of the yard is the responsibility of the owner.

(4) All new applications for water connections must be completed within 14 days by a Water Services Institutions.

(5) All user connections for water supply must be metered or measured, controlled and tariffed by the relevant Water Services Institution.

(6) A Water Service Institution shall replace stolen meters and or repair damaged meters within 30 days o

(7) Water meters must be managed and replaced within their asset lifespan

(8) The Water Services Institution shall ensure the provision of appropriate education in respect of safe, effective and efficient water use and hygiene.

Emergency water services

4.(1) A Water Services Institution must take reasonable measures to ensure that where water supply is interrupted for a period of more than 48 hours, including where an emergency situation is declared, a consumer has access to alternative water supply which—

(a) consists of at least 10 litres of potable water per person per day; and

(b) is made available at strategically determined points of delivery that are relatively convenient and safe.

(2) Whenever emergency or alternative water supply is provided, the Water Services Institution must ensure that the distributed water is fit for human consumption as per the applicable prescripts of SANS 241 (as prescribed under Regulation 5).

(3) whenever alternative drinking water sources are used for provision of drinking water for longer than a week, the water services institution must register a monitoring programme on the Integrated Regulatory Information System of the Department indicating:

(i) the origin of the alternative source(s)
(ii) compliance results with specific SANS 241parameters of disinfectant residuals, turbidity, E.coli, Heterotrophic Plate Count, conductivity and pH until distribution by tankering is discontinued
(iii) where tankers are used,
  (a) Water Services Institutions must keep accurate records of:
  (b) Vehicles type and registration and drivers used to provide the service
  (c) the volumes transported per trip
  (d) delivery schedule;
  (e) vehicles that are used for provision of other services such as dust suppression where untreated water is not recommended unless the exclusive use for a period can be guaranteed where these vehicles are first cleaned and can achieve the maintenance of the SANS standard
  (f) use of other vehicles transporting materials or liquids other than water is not permitted to tanker potable water.
  (g) Above records are to be provided as part of the monitoring system to the Department on a monthly basis.
  (h) Alternatives to tankering for mid and longer term needs to be prioritised to reduce unsustainable dependencies on tankers.

(4) Whenever water shortages are declared under the National Water Act, the Water Services Institution must impose reasonable limitations on its consumers' water consumption in its water supply network to ensure compliance with written notices issued under Schedule 3, section 6 of the National Water Act.

Quality of drinking water

5.(1) Water Services Institution must ensure that the distributed drinking water is fit for human consumption as per the applicable prescripts of SANS 241

(2) A Water Services Institution must develop and implement a water safety plan for all water supply systems in accordance with the World Health Organization approach to water safety planning.

(3) A Water Services Institution must as a minimum review its water safety plan on an annual basis. The revised plan must be submitted to the Minister using the national integrated regulatory information system at https://ws.dws.gov.za/IRIS/mywater.aspx within 30 days of approval by an accounting officer or the person delegated.

(4) A Water Services Institution must develop and implement a monitoring programme to monitor the quality of drinking water supplied to consumers in their water supply system in accordance with the requirements of SANS 241, and such monitoring programme must-

(a) provide for effective monitoring of all mandatory parameters and risks as identified through the water quality risk assessment and water safety plan;

(b) the monitoring programme must be reviewed as new risks become apparent; and

(c) together with its amendments be provided to the Department on its national integrated regulatory information system (IRIS).

(5) Samples collected by a Water Services Institution must be analysed in a laboratory using ISO 17025 accredited methodologies for water analysis or a laboratory having systems in place to ensure credibility and reliability of results such as participation in a Proficiency Testing Scheme and demonstrating acceptable results.

(6) The results of the implemented monitoring programme must be reported to the Department on its national Integrated Regulatory Information System within 30 days of sampling or on the request of the Minister.

(7) A Water Services Institution must develop and implement an incident management protocol for the management of non-compliances and categorisation of incidents.

(8) A Water Services Institution must, within 12 hours of the confirmation of an incident that poses a health risk, inform the Department's relevant Regional Office and the relevant provincial Department of Health's District Health Office of the health risk.

(9) A Drinking Water Quality Advisory Notice must be issued when—

(a) a situation has been declared an incident following repeated non-compliant results that indicates a health risk of the sampled water supply;

(b) a Water Services Institution has reason to believe that the water quality is compromised or is likely to fail to comply with SANS 241 health risks requirements;

(c) treatment processes fail to adequately treat the water according to the health limits of SANS 241; or

(d) instructed to do so by the Department.

(10) A Drinking Water Quality Advisory Notice must—

(a) specify the nature of the health risk presented and the affected area or areas;

(b) indicate rectification measures taken or to be taken by the Water Services Institution;

(c) indicate risk minimisation measures to be taken by the public; and

(d) specify a reasonable time within which the situation is expected to normalise.

(11) A Water Services Institution must ensure that drinking water quality performance results against SANS 241 are annually made available to the public and are accessible to the relevant stakeholders.

(12) Records of all results and documents must be kept for at least five (5) years by the Water Services Institution and be available at all times for regulatory and audit purposes.

Interim sanitation service

6.(1) A Water Services Authority is responsible for the capital, operation, maintenance and refurbishment actions and cost pertaining to interim sanitation services including the management of faecal sludge in the entire sanitation value chain.

(2) Where the permanency of an informal settlement is recognised, a Water Services Authority must ensure access to basic sanitation services in sparsely populated settlements, and communal toilets in densely populated.

(3) A Water Services Authority must take reasonable measures to provide interim sanitation services in temporary informal settlements and during a disaster.

(4) A Water Services Authority and / or any Water Services Provider are prohibited from providing and / or making use of the bucket toilet systems to communities in both formal and informal settlements.

(5) Interim sanitation services must provide at least the following:

(a) Communal and shared facilities in accordance with the table below:

Type	Toilet seat	Urinal Units	Hand washing
Communal toilet	1 seat per 10 households	1 unit per 20 households	1 basin per 10 toilet seats
Shared toilets	1 unit per 4 households	1 unit per 10 households	1 basin per 4 toilet seats

(b) Water and anal cleansing material must be provided. Consumers must be consulted on the most culturally appropriate cleansing methods and material.

(c) Toilets must include provision for appropriate disposal of menstrual materials (waste bins with lid that are emptied regularly) or a private washing facility.

(d) The Water Service Authority must put measures in place to keep the toilets hygienic.

(e) Each cubicle must have functional light for safety and security.

(f) The toilets must be separated according to gender to meet the needs for women, girls and persons with disability

(6) If the sanitation facility is communal, the maximum walking distance must be 50m.

(7) The duration of interim sanitation should not exceed 12 months.

(8) Parents and care givers must be provided with information by the Water Services Institution regarding safe disposal of infant's faeces, laundering practices and use of nappies, potties or scoops for effectively managing safe disposal.

(9) A Water Services Authority is through its Environmental Health Practitioners responsible for promoting hygiene and user education for ensuring an environmentally safe approach to sanitation, and for monitoring the impact of sanitation processes on the environment.

(10) Upon realisation of a new and unplanned informal settlement, the WSA must provide interim sanitation service within 30 days.

Basic sanitation service

7.(1) The standard for basic sanitation services must include the provision of a toilet with functional hand washing facility in the yard, which is safe, reliable for 24 hours a day, environmentally sound, easy to keep clean, provides privacy and protection against the weather, well ventilated, keeps smells to a minimum and prevents the entry and exit of flies and other disease-carrying pests, providing for an effective and acceptable on-site sanitation technology.

(2) A Water Services Institution must ensure that human excreta and wastewater is safely contained at all times, throughout the sanitation service chain.

(3) Each household must have uninterrupted access to an adequate, appropriate, sanitation facility.

(4) Hygiene and user education must be an integral part of sanitation service. Households should be supported with knowledge and any other relevant resources to take responsibility for the correct and consistent use of the sanitation service, including but not limited to the toilet facility.

(5) Faecal sludge management must be an integral part of the sanitation service. The infrastructure, and its maintenance as well as safe disposal of any waste must be carried out on a regular basis, as frequent as necessary to maintain hygiene, in a safe and acceptable manner by the Water Service Institution.

(a) All identified or reported full containments/ pits/ tanks for on-site sanitation must be emptied within 10 days

(b) Where containments /pits/ tanks are treated chemically or biological to prolong use and proper functioning such chemical or biological measures must not be harmful to the health of the users, the water resource or the environment and must adhere to its label applications.

(c) All portable and mobile toilets must be emptied every third day.

(d) All container-based toilets must be emptied four times a week.

(6) In providing basic sanitation a Water Services Institution must provide appropriate sanitation technologies which may differentiate between high, medium and low-density formal settlements taking the following into consideration:

(a) The need for everyone, including persons with disability to have a reasonable quality of life;

(b) Groundwater pollution risks in accordance with a protocol to manage the potential of groundwater contamination from on-site sanitation;

(c) Population size; and

(d) Economies of scale.

(7) Subject to sub-regulation (6) a Water Services Institution must provide-

(a) in dense formal settlements, waterborne sewered sanitation: Provided that the Wastewater treatment works have adequate capacity or equivalent solutions that are innovative or emerging, which are off grid (non-sewered), use little or no water and involve on-site treatment of human waste. These solutions must provide the same level of services to the user as a conventional water-borne sewered system;

(b) in medium density formal settlements, waterborne sewered sanitation: Provided that the wastewater treatment works have adequate capacity, or equivalent solutions with lower cost wastewater treatment solutions; and

(c) in low density or sparely populated settlements, non-sewered solutions which meet minimum standards set by recognised institutions.

(8) Whenever a Water Services Institution is providing new innovative non-sewered sanitation systems, such must adhere to the requirements of SANS 30500 for Non-Sewered Sanitation Systems.

(9) New settlements and developments must use water efficient sanitation solutions.

(10) Water Service Authority must monitor and regulate safe emptying, transportation, treatment and disposal of faecal sludge to faecal sludge treatment facilities or any other authorised facility.

(11) Faecal sludge treatment plants must adhere to "ISO 31800" for faecal sludge treatment units

(12) Water Service Institution must ensure sanitation workers 'safety through the provision of personal protective equipment, vaccination and deworming against diseases relevant to their working conditions.

(13) Water Service Institution must ensure workers are trained on the risks of handling faecal sludge and on standard operating procedures.

(14) Water Services Institutions must have community participation procedures of informing communities about the emptying processes, routes and health risks.

(15) Water Services Institutions must ensure safety of workers through the provision of facilities to wash with water and soap.

Emergency sanitation services

8.(1) Whenever water supply is interrupted for longer than 72 hours, including where an emergency situation affecting provision of sanitation services is declared, the Water Services Institution must make provision for alternative sanitation facilities in areas serviced with waterborne sanitation.

(2) Emergency sanitary facilities must be provided in line with the requirements of Part 3 (Emergency Housing Programme) of the National Housing Code, (2009) (Annexure B). Due

to varying geographical and similar conditions, facilities to be provided may vary from area to area, must be safe, be readily accessible by all including persons with disability, and in close walking distance, and provide for the safe disposal of human waste including hygiene and user education.

Sanitation services at public places

9.(1) Sanitation services must be family-friendly and the following must be provided:

(a) Nappy changing areas;

(b) Hook to assist with hanging handbags; and

(c) Toilets must include provision for appropriate disposal of menstrual materials (waste bins with lid that are emptied regularly).

(2) Provision must be made for sanitation facilities for persons with disabilities in adherence to the requirement set out in the SANS 10400-S:2011.

PART B: THE QUALITY OF WATER DISCHARGED INTO WATER SERVICES OR WATER RESOURCE SYSTEM

Greywater management

10.(1) A Water Services Institution planning to separate, collect and use greywater beyond the boundary of a household for any purpose must ensure such risks are identified in the wastewater risk abatement plan in accordance with regulation 11 and managed accordingly.

(2) The Guidelines for Greywater use and management in South Africa, Water Research Commission (2018) (Annexure B) must be used to assist in the identification of risk in sub-regulation (1)

Sewer collection, wastewater treatment and faecal sludge management

11.(1) A Water Services Institution responsible for the collection and treatment of wastewater and faecal sludge, must ensure that the environmental risks are identified, and climate resilient sanitation safety plans and a wastewater risk abatement plan (W_2RAP) are developed and implemented accordingly.

(2) The sanitation safety plans, and a wastewater risk abatement plan must be developed in accordance with the W_2RAP guideline, Water Research Commission (2011) (Annexure B), WHO guidelines, and must be biennially reviewed as a minimum The revised plan must be submitted to the Minister using the national integrated regulatory information system within 30 days of approval by an accounting officer or the person delegated.

(3) The Water Services Institution must—

(a) determine actual and forecasted wastewater generation within its service areas;

(b) plan for adequate sewer collection and wastewater treatment capacity within the Water Services Development Planning process;

(c) determine actual and forecasted faecal sludge accumulation in containment tanks or pits within its serviced areas;

(d) ensure that sludge from all forms of on-site sanitation is, at intervals, removed from the pit or tank or containment and conveyed to a to faecal sludge treatment facilities or any other authorised facility.

(e) plan for a safe faecal sludge emptying, transportation and treatment method within the Water Services Development Planning process;

(f) ensure that faecal sludge emptying services are conducted in compliance with the Hazardous Biological Agents Regulations (2001) under the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993); and

(g) ensure that the transportation of faecal sludge complies with the National Road Traffic Act, 1996 (Act No. 93 of 1996) and its regulations.

(4) Annual sewer and faecal sludge collection inspections and treatment process audits are required as part of the wastewater asset management process.

Quantity and quality of industrial wastewater collected into a sewerage system

12. A Water Services Institution must only accept the quantity and quality of industrial wastewater or any other substance into a sewerage system that the sewage treatment works linked to that system is capable of purifying or treating to ensure that any discharge to a water resource complies with the required authorisation and standard prescribed under the National Water Act.

Quantity and quality of wastewater discharged into a water resource

13. A Water Services Institution must only accept the quantity and quality of wastewater or any other substance into a sewerage system that the sewage treatment works linked to that system is capable of purifying or treating to ensure that any discharge to a water resource complies with the required authorisation and standard prescribed under the National Water Act.

Control of objectionable substances

14.(1) A Water Services Institution must take reasonable measures to prevent any substance other than uncontaminated storm water to enter—

(a) a storm water drain; or

(b) a watercourse, except in accordance with the provisions of the National Water Act.

(2) The water Services Institution shall ensure that inlets of stormwater drains are able to transport water whilst preventing litter or other objectionable substances from entering the stormwater. Such inlets shall be regularly cleared and maintained to ensure proper drainage and removal of objectionable substances.

(3) A Water Services Institution must take measures to prevent storm water from entering its sewerage system.

(4) WSA must take measures including customer awareness to prevent foreign objects being disposed in municipal sanitation infrastructure

PART C: THE EFFICIENT AND SUSTAINABLE USE OF WATER

Water conservation and water demand management (WCWDM)

15.(1) Where spillages or leaks in its water supply and wastewater collection network are detected or reported, a Water Services Institution must record such cases and ensure that they are contained and must repair any major, visible or reported leak within 48 hours of becoming aware thereof.

(2) A Water Services Institution must have a consumer care facility to which leaks, spillages or water services related enquiries and complaints can be reported.

(3) Whenever emergency or alternative water supply is provided in terms of Regulation 4(1), the Water Services Institution must ensure that taking of water from bulk line if applicable is appropriately metered and recorded (i.e. if alternative water is provided through tankering the number of tankers and their volume must be recorded when taking from a bulk metered pipeline.

(4) A Water Services Institution must implement a Pressure Management Programme allowing water reticulation systems to be operated at a maximum pressure of 900 kPa.

(5) Where water pressure in a water reticulation system could rise above 900 kPa, a Water Service Institution must install a pressure control device to prevent the pressure at any domestic consumer connection from rising above 900 kPa.

(6) A Water Services Institution must take steps to measure and progressively reduce losses, maintain the water use efficiency Key Performance Indicators including the quantity of water losses, the quantity of Non-Revenue Water, Infrastructure Leakage Index and per capita Usage to within international accepted norms as follows:

(a) Non-Revenue Water, 10-20%

(b) Water Losses, 10-20%

(c) Infrastructure Leakage Index, 2-4

(d) *Per Capita* Usage, 150-200 l/c/d

(7) Water Services Institutions must develop and implement a Council approved WCWDM Strategy and Business plan consisting of at least the following:

(a) Situation Assessment

(b) Key issues and Challenges

(c) Focus Areas of Interventions

(d) List of proposed interventions

(e) Set targets for demand, Non-Revenue Water, water losses (commercial and real losses) in line with subsection 6 above,

(f) Budgets and Multi –year Implementation timelines

PART D: CONSTRUCTION AND FUNCTIONING OF WATER SERVICES WORKS AND CONSUMER INSTALLATIONS

Water and wastewater balance analysis and determination of water losses

16.(1) A Water Services Institution must install and monitor appropriate water measuring devices or volume controlling devices to measure, detect and account for the volume of water abstracted, treated, lost and consumed, as applicable to the technical configuration of infrastructure, the water use authorisation conditions and to all user connections.

(2) A Water Services Institution must install and monitor appropriate measuring devices or volume controlling devices to measure, detect and account for the volume of wastewater received from user connections, conveyed, treated, reused and discharged, as applicable to the technical configuration of infrastructure and the water use authorisation conditions.

(3) A Water Services Institution must ensure that all measuring devices or meters are properly maintained and in good working order, implementing a programme for meter – In-situ-verification and calibration.

(4) A Water Services Institution must account for its water balance on a monthly basis as follows:

(a) measure the daily volume abstracted and treated; and

(b) measure the quantity of water provided to each supply zone within its supply area.

(5) A Water Services Institution must account for its wastewater balance on a monthly basis as follows:

(a) daily inflows in Ml/d; and

(b) daily outflows in Ml/d.

(6) A Water Services Institution must determine the quantity of water losses and non-revenue water in accordance with the Departmental Municipal Water Balance Guideline (2014) (Annexure B).

(7) The results of the water balance analysis and the records of the quantities of water measured as set out in sub-regulation (5) must be reported to the Department's National Regulatory Information Management System on a quarterly basis.

Consumer installations other than meters

17. Every consumer installation must comply with SANS 10252: Water Supply and Drainage for Buildings and SANS 10254: The Installation of Fixed Electric Storage Water Heating Systems, or any similar substituting re-enactment or amendment thereof if the consumer installation is of a type regulated by either standard.

PART E: THE NATURE, OPERATION, SUSTAINABILITY, OPERATIONAL EFFICIENCY AND ECONOMIC VIABILITY OF WATER SERVICES

Human resource planning

18.(1) A Water Services Institution must determine the staff establishment necessary to perform the water services functions in compliance to these standards and the Process Controller Regulations (GN 3630, June 2023), read together with GN 890 Local Government Municipal Staff Regulations and GN R 493 Municipal Regulations on Minimum Competency Levels, 2007 with particular reference to:

(a) The number of staff members required;

(b) The minimum competencies required;

(c) Plan for the recruitment, retention and development of staff members according to these regulatory requirements and the Engineering Council of South Africa (ECSA) guidelines on professional fees determined in terms of section 34 of the Engineering Profession Act of 2000, and Section 4 of the Council for the Built Environment Act, 2000.

Competency requirements for the Head of a Water Services Authority, and Managers reporting to this Head responsible for Water and Sanitation Planning, Infrastructure Provision, Operations and Maintenance of Water Services

19.(1) A person appointed to manage the Water Services Authority function, the Water Services Planning Unit, the Infrastructure Provision Unit, the Operations and Maintenance Unit in a Water Services Institution must –

(a) Have the necessary competencies; and

(b) Comply with the minimum requirements for education qualifications, work experience and knowledge as set out in Annexure A.

(2) Water Services Institutions when advertising and filling these posts shall remunerate these posts in line with ECSA salary guidelines determined under Section 34(2) of the Engineering Profession Act. 2000 (Act No. 46 of 2000). (Annexure B)

(3) Should a staff member who was appointed before these Standards came into effect have the necessary qualification but not have the necessary competencies or registrations, the Water Services Institution must place the staff member on a programme to acquire the competency requirements as prescribed, if successful completion of such programme will yield achievement of the minimum requirements set within a reasonable time.

(4) Where the competency gaps, development needs and registration requirements cannot be addressed or reasonably attained through a programme in sub-regulation 19(2), or where the staff member does not have the minimum qualifications, the Water Services Institution must, based on a competency assessment, determine an alternative placement for the affected staff member to enable the recruitment of staff members with the necessary competencies within 2 years of publication of these Standards.

Management of negative impact of disruptive electricity supply on water services

20.(1) To mitigate against the negative impact of the current provision of electricity supply on water service provision, a Water Service Institutions must -

(a) make provision for the installation and operation of diesel generators or similar within their critical water and wastewater system infrastructure to ensure continuation of operations when there is power supply disruptions

(b) alternative sources of electricity should be developed, which may include but are not limited to off-take agreements with independent power producers or embedded generators or through direct ownership.

(c) such infrastructure as well as the power supply must be safeguarded against vandalism and theft

(2) Water Service Institutions shall maximise water treatment whilst electricity is available.

(3) Water Service Institutions shall revise the minimum operational levels for their reservoirs to increase storage capacity.

(4) Water Service Institutions shall, where practically possible, increase water treatment and reservoir storage capacity to enable them to better manage periods of interrupted power supply.

(5) Where electricity is supplied from municipality, Water Boards and Water Services Authorities shall, where practically possible and through municipal electricity departments, isolate water and sanitation infrastructure.

(6) Should a water service institution be exempted from loadshedding and the exemptions from load shedding attracts penalties or extra charges, Water Boards and Water Service Authorities shall request exemptions from such penalties or extra charges.

(7) Water Service Authorities shall develop integrated response plans to maintain drinking water and wastewater service standards during load shedding addressing the measure listed in the sub -regulation above.

(8) The integrated response plans referred to in sub-regulation 7 shall be across the water and sanitation, electricity, and other divisions of the Water Service Authority.

Maintenance and operation of water treatment works and water supply network

21.(1) The water system must be serviced by a competent maintenance team, executing the maintenance work according to an acceptable maintenance plan and schedule.

(2) A Water Services Institution must keep a logbook with maintenance entries as per the maintenance plan per system.

(3) Where a water treatment works is being upgraded or constructed the Water Services Institution must ensure the development of an operation and maintenance manual for the infrastructure before such infrastructure is handed over to the Water Services Institution.

(4) A Water Services Institution must document the design capacity of the water treatment works and the works must be operated within the authorised abstraction volume or as per the application submitted to the Department for authorisation under the National Water Act.

(5) A water treatment works must be subjected to an annual process condition assessment and a Process Audit (which will address that year's process condition assessment) in a three-year cycle to inform functionality of the water supply system infrastructure. Risk findings must be incorporated into the Water Safety Plan.

Maintenance and operation of wastewater treatment system

22(1) The wastewater treatment system (both mechanical and electrical) must be serviced by a competent maintenance team, executing the maintenance work according to an acceptable maintenance plan and schedule.

(2) A Water Services Institution must keep a logbook with maintenance entries as per the maintenance plan per system.

(3) Where a wastewater treatment works is being upgraded or constructed the Water Services Institution must ensure the development of an operation and maintenance manual for the infrastructure before such infrastructure is handed over to the Water Services Authority.

(4) Operation and maintenance services are linked to the level of services selected to a settlement or part of a settlement. The following operations and maintenance guidelines developed must be utilised and used as a benchmark for water supply and sanitation services operations:

(a) Water borne sanitation operations and maintenance guide, Water Research Commission (2011); and

(b) Maintenance management standard for immovable assets (2017) (Annexure B).

(5) A Water Services Institution must document the design capacity (hydraulic and organic) of the wastewater treatment works and the facility must be operated within the authorised volume and conditions as required and stipulated under the National Water Act.

(6) A wastewater treatment works must be subjected to an annual process condition assessment and Process Audit (which will address that year's process condition assessment) in a three-year cycle to inform functionality and performance of the wastewater system infrastructure including the sewer reticulation network and pump station(s). Risk findings must be incorporated into the wastewater risk abatement plan (W_2RAP) as stipulated in regulation 11(1).

Operation and maintenance budget and costing

23.(1) A Water Services Institution must determine the actual operations and maintenance cost of water treatment and supply (reticulation) per water supply system and express this in R/m^3.

This determination must include –

(a) energy use for treatment and pumping;

(b) compensation of employees;

(c) chemical costs; and

(d) maintenance cost.

(2) A Water Services Institution must have a cost reflective Operation and Maintenance budget per water supply system for water treatment and supply (reticulation) and wastewater system (collection and treatment).

(3) A Water Services Institution may define specific on-site sanitation components of a basic sanitation facility that will remain the responsibility of the household, and the household remains responsible for paying for these components.

(4) A Water Services Authority must have clear By-laws regarding the operation and maintenance of sanitation infrastructure and facilities within its jurisdiction.

Water and sanitation services infrastructure management

24.(1) A Water Services Authority must ensure that all water and sanitation services and infrastructure are planned for the full life-cycle, and that all life-cycle elements and costs are considered and must be in accordance with the Water Services Infrastructure Asset Management Strategy (2011) (Annexure B).

(2) Asset management must be proactive, entrenched and on-going in the responsibilities of the service providers.

(3) Asset Management Plans and registers must be compiled by services authorities or providers together with their Water Services Development Plans.

(4) A Water Services Authority must engage in dialogue with customers about the costs and risks associated with deteriorating assets to develop a more comprehensive needs assessment and enable analysis of different approaches to extend the life of its infrastructure. This will assist service providers in explaining the value, benefits and costs of infrastructure repairs.

(5) A Water Services Authority must–

(a) develop a Water and Sanitation Asset Management Plan in conjunction with its Water Services Development Plan;

(b) establish a Water and Sanitation Asset Management Team;

(c) establish levels of service and key performance indicators;

(d) create an inventory of water and sanitation assets;

(e) design a risk assessment programme, considering water and sanitation assets to be managed and how they might fail;

(f) establish the remaining life of water and sanitation assets;

(g) record all breaks and failures, including leaks;

(h) for underground water and sewer pipelines, conduct a pipe replacement analysis or study to determine a multi-year replacement budget;

(i) gauge the current condition of water and sanitation assets through condition assessments as set out in Regulation 11(4).

(j) plan renewal activities; and

(k) continuously improve water and sanitation asset management activities.

Water services audit as a component in the Water Services Development Plan

25. (1) A Water Services Institution must include a water services audit in its annual report on the implementation of its water services development plan required in terms of section 18(1) and (2)(a) of the Act, which must also be submitted to the department on an annual basis, within 4 months after the end of each municipal financial year.

(2) A water services audit must assess compliance to these Norms and Standards and must as a minimum, contain the following details:

(a) The quantity of water services provided, which must include at least—

(i) the quantity of water used by each user sector;

(ii) the quantity of water provided to the Water Services Institution by another Water Services Institution;

(iii) the quantity of wastewater received at sewage treatment works.

(iv) the quantity of wastewater not discharged to wastewater treatment works and approved for use by the Water Services Institution;

(v) the quantity of faecal sludge received at faecal sludge treatment works.

(vi) the quantity of faecal sludge not discharged to faecal sludge treatment works approved for use by the Water Services Institution; and

(vii) the quantity of faecal sludge entrenched and the coordinates on the entrenchment site;

(b) The levels of services rendered, which must include at least—

(i) the number of user connections in each user sector;

(ii) the number of households provided with water through communal water services works;

(iii) the number of consumers connected to a water reticulation system where pressures rise above 900 kPa at the consumer connection;

(iv) the number of households provided with sanitation services through consumer installations connected to the sewerage system;

(v) the number of households with access to basic sanitation services;

(vi) the number of new water supply connections made;

(vii) the number of new sanitation connections made;

(viii) the number of on-site sanitation systems in each user sector;

(ix) the number of households provided with onsite sanitation through communal facilities;

(x) the type of onsite sanitation systems in the area of jurisdiction;

(xi) the number of new onsite sanitation systems provided; and

(xii) the number of sanitation systems with full tanks or pits.

(c) The numbers provided in compliance with sub-regulation (2)(b) must be expressed as a percentage of the total number of connections or households.

(d) Cost recovery must include at least—

(i) the tariff structures for each user sector; the cost-reflective tariff should generate sufficient revenue to allow for the required operation and maintenance and also generate an acceptable surplus to allow for reinvestment into infrastructure

(ii) the income collected expressed as a percentage of the total costs for the water services provided; and

(iii) unrecovered charges expressed as a percentage of the total costs for water services provided.

(e) All Meter installation (including Bulk, Zonal, District, and Consumer meters) and meter testing must include at least—

(i) the number of new meters installed s ; and

(ii) the number of meters tested (in-situ-verification) and the number of meters replaced expressed as a percentage of the total number of meters installed on an annual basis

(f) The water quality sampling programme required under regulation 5(4), the results of the comparison set out in regulation 5(5) and any non-compliance reported as required under regulation 5(6);

(g) Water conservation and water demand management must include at least—

(i) the results of the water balance as set out in regulation 16;

(ii) the total quantity of water losses and non-revenue water;

(iii) the demand management activities undertaken;

(iv) measures implemented to reduce water losses and non-revenue water

(v) the progress made in the installation of water efficient devices; and

(vi) performance measured against key performance indicators

(h) A Water Services Institution's compliance status to regulation 18(1) and 19(1) and progress of implementation toward achieving compliance

(i) The integrated response plan to mitigate the adverse impact of electricity supply on critical water services infrastructure

(j) Evaluation of efficacy of measures implemented to address risk findings from the annual condition assessment and three-yearly process audits as required for water

treatment works and the water supply network (sub-regulation 21(5)) and the wastewater system (sub-regulation 22(6)).

(k) A Water Services Institution must provide evidence of the operations and maintenance expenditure per annum which must be measured in relation to the original budget contemplated in regulation 23(3).

Repeal of regulations

26. The Regulations relating to compulsory national standards and measures to conserve water published by General Notice Regulation 509 of 8 June 2001 are hereby repealed.

Short title

27. These Regulations are called the Compulsory National Water and Sanitation Services Norms and Standards, 2022.

Annexure A: Competency requirements for the Head of a Water Services Authority, and Managers reporting to this Head responsible for Planning, Infrastructure Provision, Operations and Maintenance of Water Services

The minimum requirements for education qualifications, work experience and competencies for the Head of a Water Services Authority (see Table 1 and 2) and Managers reporting to this Head responsible for Water and Sanitation Planning (Table 1 and 3), Infrastructure Provision (Table 1 and 4), and Operations and Maintenance (Table 1 and 5) of Water Services are as outlined in the tables below. As skills provide meaning to the competencies, a list of skills are included in this Regulation for information purposes only. The skills list is not comprehensive but substantially developed read together with the WRC report (2015) on water sector skills (Annexure B).

Table 1: Qualification, years' experience and Statutory registration requirements for all

Qualification, years' experience and Statutory registration requirements for all
Engineering degree (BEng/BSc(Eng) in Civil Engineering. For a category B municipality: 15 years post qualification experience and registration as a professional engineer required For category A and C municipalities: 20 years post qualification experience and registration as a professional engineer required

Table 2: Experiential Competency: Head of Water Services Authority

Experiential Competency: Head of Water Services Authority			
Function	**Competency Cluster**	**Competency**	**Skills**
1.1 Functional Management	Business Management	Strategic Thinking	Manage the technical and/or W&S department. Control, evaluate and adjust a continuous-improvement strategy for W&S services. Implement a continuous-improvement strategy. Manage and report on the performance of a technical and/or W&S department. Determine and manage a financial budget. Oversee and/or manage performance assessments of staff. Contribute to identifying the training needs of staff. Knowledge of moving towards "SMART" water i.e., knowledge of IT and communications technology as related to W&S services especially monitoring or controlling devices and meters. Manage external customers viz. strategic customers or users of the municipal services and other provincial and national sector departments. Manage internal customers viz. fellow municipal Directors, the Municipal Manager, and the Municipal Council. Knowledge of &S services bylaw enforcement. Knowledge of relevant supply chain management regulations and rules. Knowledge of relevant South African labour legislation. Knowledge of health and safety legislation.
1.2 W&S Planning	W&S Services Hydraulics	Surface Water Assessments	Assess assurance of supply. Interpret hydrological modelling and analysis.
		Groundwater/ Geohydro-logical Assessments	Interpret geological reports and groundwater and borehole studies.
		Water Demand Calculations	Outline various levels of service options with capital and O&M financial implications. Determine trends in water demand. Set unit water demands (UWD) for domestic, office, commercial and industrial use based on billing data analysis or other means. Set unit sewer outflow rates. Set feasible non-revenue water targets with a concomitant budget.
		Hydraulic Modelling	Interpret results from hydraulic models to verify the modelling process. Layout networks using computer software. Determine most appropriate locations for future reservoirs. Determine appropriate sizes of future reservoirs. Calculate required pump capacity (water and sewer). Determine required pipes sizes (water and sewer). Determine required capacity of WTWs and WWTWs. Conduct cost of supply studies (water and sanitation). Conduct pipe replacement studies (water and sanitation)

Experiential Competency: Head of Water Services Authority			
Function	**Competency Cluster**	**Competency**	**Skills**
	W&S Information Management Systems	W&S Spatial Data Management	Create a GIS architecture. Create other management information systems e.g., for wayleaves, as-built drawings, standard drawings. Oversee the development of procedures to maintain information management systems. Enforce use of all systems by staff.
	Water Services Strategies Studies and Plans	W&S Policy Development	Develop W&S policy statements and policy options. Advocate W&S policy statements and policy options. Manage a structured process to obtain consensus on the preferred W&S policy position using technical, financial, social and other criteria. Write and obtain Council approval for a W&S policy.
		W&S Strategy Development	Develop a W&S strategy based on W&S policies. Advocate a W&S strategy. Manage a structured process to obtain consensus on a W&S strategy. Write Council memos and obtain Council approval on a W&S strategy. Implement a W&S Strategy.
		W&S Service Level Management	Set criteria/select appropriate W&S services levels per supply area. Determine design criteria for service levels and/or write a design guideline. Oversee development of standard drawings for all infrastructure. Determine O&M management options for each level of service. Calculate unit capital, O&M and lifetime costs for various service levels.
		W&S Asset Management	Oversee the development or updating of asset management policy and procedures with the finance department. Oversee the development or updating of asset management plan. Produce a technical asset register for the finance department.
		W&S Master Planning	Manage the development or updating of a master plan (water and sewer). Write specifications to advertise for master planning services. Interpret information on future areas for town-wide development. Compare different bulk water supply options. Calculate unit capital development contributions for developer contributions. Create procedures to ensure the master plans are implemented by infrastructure provision staff.
		W&S Development Planning	Knowledge of legal requirements for a WSDP. Interrogate information from the national DWS geodatabase. Integrate municipal information into the national DWS Geodatabase. Manage consultation on- and approval of the WSDP. Publish the WSDP.
		W&S Appropriate Technology Assessments	Research and identify appropriate sanitation technologies. Research and identify appropriate water services technologies.
1.3 W&S infrastructure	W&S Services Design	Design of Bulk Infrastructure (general)	Knowledge of the design process for bulk infrastructure. Knowledge of developing and customising design criteria for bulk infrastructure. Knowledge of developing and customising standard drawings. Knowledge of O&M requirements for bulk infrastructure. Knowledge of monitoring/control systems for bulk infrastructure e.g., telemetry. Knowledge of equipment and material standards and rule on acceptable equipment and materials.
		Design of Treatment Works	Knowledge of the design process for WTW and WWTW infrastructure.
		Design of Reservoirs	Calculate storage requirements for required capacity, balancing and fire suppression. Knowledge of static pressures in reservoirs. Knowledge of detailed design process including contents of tender documents for the construction of reservoirs. Knowledge of the operational aspects and cleaning of reservoirs. Knowledge of condition assessments of reservoirs.

Experiential Competency: Head of Water Services Authority			
Function	**Competency Cluster**	**Competency**	**Skills**
		Design of W&S Networks and Pump Stations	Knowledge of the detailed design process for distribution (water) and collection networks (sewer). Knowledge of pipe materials, pressure classes, unit rates and construction standards. Knowledge of detailed pump selection processes.
	Water Services Construction	Tender Management, Bid Adjudication and Placing of Contracts	Define project scope, project schedule and deliverables. Knowledge of tender document contents for construction. Knowledge of bill of quantities using SANS references for pipeline construction. Knowledge of bill of quantities using SANS references for pump stations. Edit draft tender documents from consultants to ensure completeness. Compile contract and/or service level agreements. Adhere to government supply chain management. Evaluate bids and negotiate where allowed. Oversee the appointment of contractors with all required legal documentation.
		Contract Administration	Knowledge of the South African GCC and the entire construction process. Act as employer's representative and make all rulings on the employer's behalf. Calculate contract price adjustment. Identify, record, and mitigate construction risks. Approve contractor payment certificates. Maintain a summary expenditure record for the project. Manage subcontractor agreements. Facilitate small subcontractor development. Compile and manage a defects list. Compile a practical completion certificate. Manage a defects liability period. Compile a project closure report. Ensure compliance with standard construction drawings.
		Health, Safety, Environmental and Quality Management (SHEQ)	Ensure compliance with the safety legislation and construction regulations. Write safety specifications. Develop a SHEQ plan. Conduct a SHEQ risk assessment. Appoint and train a SHEQ officer. Train a health and safety team. Purchase and maintain required first aid equipment. Implement health and safety requirements. Maintain a safety file. Conduct health and safety audits. Report accidents and injuries to relevant authorities.
		Technical Work on Construction Sites	Knowledge of surveying. Knowledge of borehole drilling and testing. Knowledge of bricklaying. Knowledge of carpentry. Knowledge of welding. Knowledge of pipelaying. Knowledge of electrical work related to water and sanitation services. Knowledge of mechanical work related to to water and sanitation services. Knowledge of operations of small plant.
1.4 W&S Operation and Maintenance	W&S Bulk O&M	O&M of Bulk Infrastructure	Calculate annual operating, maintenance and repair budgets. Interpret raw water licence conditions. Control raw water take-off within licence conditions. Operate all aspects of water and sanitation infrastructure and networks. Develop operating rules. Source appropriate equipment for flow and pressure logging. Conduct Positive Displacement Test (PDT) of reservoirs. Interpret hydraulic modelling results and compare to actual system operational performance. Implement preventative maintenance servicing of pumps and motors. Implement corrective maintenance activities (breakdowns). Maintain, check the operation of, and test bulk meters. Maintain and check the operation of air valves and scour valves. Maintain and check the operation of a telemetry system. Maintain and check the operation of electrical switchgear. Maintain sites e.g., paint buildings, grass, fences, walkways and roads. Repair pipelines and auxiliary works.

Experiential Competency: Head of Water Services Authority			
Function	**Competency Cluster**	**Competency**	**Skills**
			Repair mechanical equipment. Repair electrical equipment. Commission new and modified bulk equipment.
		O&M of Treatment Works	Calculate annual operating, maintenance and repair budgets. Manage the overall treatment work(s) function (to comply with legislation). Maintain plant performance and maintenance process records. Undertake process(es) to optimise works. Manage corrective maintenance activities (breakdowns) as required. Troubleshoot process failures on WTW. Undertake investigations related to non-conformance of WTWs. Order and control use of chemicals and maintain stores inventory. Set dosages and chemical feed rates in line with inflow rates and water quality. Interpret water quality results to identify adjustments to chemical additives and plant operations. Maintain site(s). Check operation of all valves and valve stem packing. Backwash filters. Remove silt, clarifier, sedimentation and filter sludge. Treat clarifier and filter sludge. Implement preventative maintenance servicing of pumps and motors. Clean grit channels. Operate a sludge treatment plant. Remove accumulated sludge from sludge plant. Maintain electrical switchgear. Knowledge of relevant legislation and regulations. Knowledge of the implications of chemical pollution on the environment.
		Scientific Services in O&M	Take samples of water and wastewater. Test raw water influent to WTW. Analyse raw water quality to determine treatment requirements. Test treated water to ensure compliance with potable water quality standards. Recommend adjustments to treatment processes. Develop statistical process control charts. Interpret statistical process control charts. Knowledge of ISO 9000 Quality Management System.
	W&S Networks O&M	O&M of Networks including small pumps	Calculate annual operating, maintenance and repair budgets. Inspect water mains. Inspect water mains pipe connections. Inspect pipe bridges. Inspect equipment. Inspect manholes. Install, calibrate and operate flow meters and telemetry system. Calibrate flow meters. Refurbish and replace infrastructure. Construct and repair manholes. Construct and repair inspection chambers. Provide customer connections, valves and meters. Repair pipe breaks in reticulation network. Flush and disinfection of repaired sections Manage fluctuating water levels and pressures. Write start up procedures for all pumps. Implement start up procedures for all pumps. Write shut down procedures for all pumps. Implement shut down procedures for all pumps. Read and record flow measuring equipment. Test and replace flow measuring equipment. Repair electrical cables. Replace electrical gauges. Maintain electrical motors. Maintain diesel generators and motors. Maintain pumps and valves. Maintain pump station buildings including fencing. Supervise assets. Undertake audits of tools and equipment. Verify and sign off subcontractors completed work. Verify that meters are correctly installed. Advise on when meters must be calibrated. Identify where additional meters are required. Identify when meters need to be repaired and notify relevant parties. Capture meter readings using applicable software. Produce meter readings reports using applicable software.

Experiential Competency: Head of Water Services Authority			
Function	**Competency Cluster**	**Competency**	**Skills**
		Electrical works in O&M	Join electrical cables. Terminate electrical cables. Lay cables below ground. Lay cables on racks. Install overhead cabling. Install small transformers ensuring correct phasing. Install large transformers ensuring correct phasing. Assemble oil coolers on transformers. Assemble bushings on large transformers. Install low voltage switchgear less than 3.3kV. Install high voltage switchgear greater than 3.3kV. Install electric motors ensuring correct phasing. Install electric motor controls and instrumentation. Install small single-phase submersible pumps and control box. Select appropriate distribution boards and installation of circuit breakers. Select, test and install earthing equipment. Knowledge of installation rules as per SANS 10142.
		Safety, Health, Environmental and Quality Management (SHEQ) in O&M	Write safety specifications. Develop a SHEQ plan. Conduct a SHEQ risk assessment. Appoint and train a SHEQ officer. Train a health and safety team. Purchase and maintain required first aid equipment. Implement all safety procedures according to prescribed systems (OHSAS 18001 or ISO 9001). Maintain a safety file. Conduct health and safety audits. Report accidents and injuries to relevant authorities. Analyse trends in accidents and causes of specific accidents. Conduct advocacy and awareness sessions with staff. Manage the security of people and buildings. Knowledge of environmental stresses e.g., dust, noise, heat, ergonomics. Knowledge of legislative requirements. General knowledge of Environmental Impact Assessment legislation as per NEMA. Knowledge of SHEQ systems i.e., policy, procedures, work instructions etc. Scope the work, compile tender documents, adjudicate bids and appoint service providers. Carry out WTW/WWTWs plant housekeeping to the required standards.
		Water loss Management	Write a NRW strategy and plan. Calculate NRW programme expenses and cost savings (planned and actual) Interpret water loss management reports and technical information. Examine sector flow meter records to identify high usage or sudden changes. Examine and conduct data analysis on consumer billing records. Determine water balances as per IWA. Conduct site-specific inspections to identify leakage points. Appoint contractors to repair or adjust infrastructure. Monitor contractors work and approve payments. Write customer-focused water loss awareness material. Advertise and promote water loss management material. Encourage public to report water losses from municipal systems.
	W&S Incident Management	W&S Management in Floods and Droughts	Identify risk to infrastructure and water supply during floods and droughts. Plan for emergency water source provision to disaster-affected communities. Identify local service providers with short-notice equipment availability. Negotiate assistance from fire and emergency services and other organisations. Manage implementation of emergency water provision to affected communities. Design and implement transition from emergency water supply to at least the previous service level.
		W&S Infectious Disease Outbreak Response	Plan for emergency water supply provision to disaster-affected communities. Assess immediate emergency water supply requirements. Implement emergency water supply provision to disaster affected communities. Identify pathogen(s) with health department and source of outbreak. Identify transmission route with health department. Conduct awareness training on disease transmission route(s).

Experiential Competency: Head of Water Services Authority			
Function	**Competency Cluster**	**Competency**	**Skills**
			Design transition from emergency water supply provision to at least previous service level.
		W&S Pollution Response	Identify the chemical, physical, microbiological and ecological impact of different pollutants on the human and aquatic environment. Recommend environmental management plans for activities with a water pollution risk. Decide when, and issue warnings to affected water users to refrain from using polluted water. Manage illegal contraventions. Manage emergency control measures in the case of accidental spillage.
	Fleet Management for O&M		Identify correct fleet requirements and kitting out of vehicles/trucks. Write specifications for purchase or lease of vehicles. Follow supply chain management rules to secure fleet and fleet maintenance. Manage and oversee a fleet management system. Manage and oversee a vehicle tracking software system. Knowledge of vehicles and maintenance requirements. Carry out minor service on petrol vehicles. Carry out minor service on diesel vehicles. Troubleshoot on engine compartment using diagnostic machines. Maintain vehicle diesel engines. Maintain vehicle petrol engines. Fix and overhaul vehicle clutch. Fix and overhaul gearbox and differential. Fix and overhaul a vehicle engine cylinder head. Replace cam belt and adjust timing. Overhaul the entire vehicle engine. Maintain and repair pneumatic brake systems. Maintain and repair tractor brakes. Knowledge of auto-electrical wiring systems. Fix and replace general parts such as shocks, brakes, axle and lights. Balance wheels using a wheel balancing machine. Align wheels using a wheel alignment machine. Grease relevant parts on TLBs and excavators. Replace skidders and blades on slashers. Tension and grease chains on sludge trailers.

Table 3: Experiential Competency : Head of Water Services Planning

Experiential Competency : Head of Water Services Planning			
Function	**Competency Cluster**	**Competency**	**Skills**
1.1 Functional Management	Business Management	Strategic Thinking	Manage the technical and/or W&S planning sub-directorate/section. Manage and report on the performance of long-term planning. Determine and manage a financial budget for planning. Knowledge of raising funds, including private funds, for infrastructure development. Knowledge of "SMART" water in relation to long-term planning options i.e., knowledge of IT and communications technology as related to W&S services especially monitoring or controlling devices and meters. Establish/fill an organogram with required staff and expertise for planning. Oversee and/or manage performance assessments of planning staff. Contribute to identifying the training needs of planning staff. Manage external customers regarding planning coordination. Manage internal customers regarding planning coordination. Knowledge of relevant supply chain management regulations and rules.
1.2 Water Services Planning	W&S Services Hydraulics	Surface Water Assessment	Assess assurance of supply. Interpret hydrological modelling and analysis.
		Groundwater / Geohydro-logical Assessments	Interpret geological reports and groundwater and borehole studies.
		Water Demand Calculations	Outline various levels of service options with capital and O&M financial implications. Determine trends in water demand. Set unit water demands (UWD) for domestic, office, commercial and industrial use based on billing data analysis or other means. Set unit sewer outflow rates. Set feasible non-revenue water targets with a concomitant budget.
		Hydraulic Modelling	Interpret results from hydraulic models to verify the modelling process. Layout networks using computer software. Determine most appropriate locations for future reservoirs. Determine appropriate sizes of future reservoirs. Calculate required pump capacity (water and sewer). Determine required pipes sizes (water and sewer). Determine required capacity of WTWs and WWTWs. Conduct cost of supply studies (water and sanitation). Conduct pipe replacement studies (water and sanitation)
	W&S Information Management	Water Services Spatial Data Management	Create a GIS architecture. Create other management information systems e.g., for wayleaves, as-built drawings, standard drawings. Oversee the development of procedures to maintain information management systems. Enforce use of all systems by staff.
	Water Services Strategies Studies and Plans	W&S Policy Development	Develop W&S policy statements and policy options. Advocate W&S policy statements and policy options. Manage a structured process to obtain consensus on the preferred W&S policy position using technical, financial, social and other criteria. Write and obtain Council approval for a W&S policy.
		W&S Strategy Development	Develop a W&S strategy based on W&S policies. Advocate a W&S strategy. Manage a structured process to obtain consensus on a W&S strategy. Write Council memos and obtain Council approval on a W&S strategy. Implement a W&S Strategy.
		W&S Service Level Management	Set criteria/select appropriate W&S services levels per supply area. Determine design criteria for service levels and/or write a design guideline. Oversee development of standard drawings for all infrastructure. Determine O&M management options for each level of service. Calculate unit capital, O&M and lifetime costs for various service levels.
		W&S Asset Management	Oversee the development or updating of asset management policy and procedures with the finance department. Oversee the development or updating of asset management plan. Produce a technical asset register for the finance department.

Experiential Competency : Head of Water Services Planning			
Function	**Competency Cluster**	**Competency**	**Skills**
		W&S Master Planning	Manage the development or updating of a master plan (water and sewer). Write specifications to advertise for master planning services. Interpret information on future areas for town-wide development. Compare different bulk water supply options. Calculate unit capital development contributions for developer contributions. Create procedures to ensure the master plans are implemented by infrastructure provision staff.
		W&S Development Planning (WSDP)	Knowledge of legal requirements for a WSDP. Interrogate information from the national DWS geodatabase. Integrate municipal information into the national DWS Geodatabase. Manage consultation on- and approval of the WSDP. Publish the WSDP.
		W&S Appropriate Technology Assessments	Research and identify appropriate sanitation technologies. Research and identify appropriate water services technologies.

Table 4: Experiential Competency : Head of Water Services Infrastructure Provisioning

Experiential Competency : Head of Water Services Infrastructure Provisioning			
Function	**Competency Cluster**	**Competency**	**Skills**
1.1 Functional Management	Business Management	Strategic Thinking	Manage the technical and/or W&S infrastructure provision sub-directorate/section. Manage and report on the performance of infrastructure development. Determine and manage a financial budget for infrastructure development. Knowledge of "SMART" water in relation to long-term planning options i.e., knowledge of IT and communications technology as related to W&S services especially monitoring or controlling devices and meters. Establish/fill an organogram with required staff and expertise for infrastructure development. Oversee and/or manage performance assessments of infrastructure development staff. Contribute to identifying the training needs of infrastructure development staff. Manage external customers regarding infrastructure development coordination. Manage internal customers regarding infrastructure development coordination. Knowledge of relevant supply chain management regulations and rules. Knowledge of safety legation.
1.2 Water Services Infrastructure	W&S Services Design	Design of Bulk Infrastructure (general)	Knowledge of the design process for bulk infrastructure. Knowledge of developing and customising design criteria for bulk infrastructure. Knowledge of developing and customising standard drawings. Knowledge of O&M requirements for bulk infrastructure. Knowledge of monitoring and control systems for bulk infrastructure e.g., telemetry. Knowledge of equipment and material standards and rule on acceptable equipment and materials.
		Design of Treatment Works	Knowledge of the design process for WTW and WWTW infrastructure.
		Design of Reservoirs	Calculate storage requirements for required capacity, balancing and fire suppression. Knowledge of static pressures in reservoirs. Knowledge of detailed design process including contents of tender documents for the construction of reservoirs. Knowledge of the operational aspects and cleaning of reservoirs. Knowledge of condition assessments of reservoirs.
		Design of W&S Networks and Pump Stations	Knowledge of the detailed design process for distribution (water) and collection networks (sewer). Knowledge of pipe materials, pressure classes, unit rates and construction standards. Knowledge of detailed pump selection processes.
	Water Services Construction	Tender Management, Bid Adjudication and Placing of Contracts	Define project scope, project schedule and deliverables. Knowledge of tender document contents for construction. Knowledge of bill of quantities using SANS references for pipeline construction. Knowledge of bill of quantities using SANS references for pump stations. Edit draft tender documents from consultants to ensure completeness. Compile contract and/or service level agreements. Adhere to government supply chain management. Evaluate bids and negotiate where allowed. Oversee the appointment of contractors with all required legal documentation.
		Contract Administration	Knowledge of the South African GCC and the entire construction process. Act as employer's representative and make all rulings on the employer's behalf. Calculate contract price adjustment. Identify, record, and mitigate construction risks. Approve contractor payment certificates. Maintain a summary expenditure record for the project. Manage subcontractor agreements. Facilitate small subcontractor development. Compile and manage a defects list. Compile a practical completion certificate. Manage a defects liability period. Compile a project closure report. Ensure compliance with standard construction drawings.

Experiential Competency : Head of Water Services Infrastructure Provisioning			
Function	**Competency Cluster**	**Competency**	**Skills**
		Health, Safety, Environmental and Quality Management (SHEQ)	Ensure compliance with the safety legislation and construction regulations. Write safety specifications. Develop a SHEQ plan. Conduct a SHEQ risk assessment. Appoint and train a SHEQ officer. Train a health and safety team. Purchase and maintain required first aid equipment. Implement health and safety requirements. Maintain a safety file. Conduct health and safety audits. Report accidents and injuries to relevant authorities.
		Technical Work on Construction Sites	Knowledge of surveying. Knowledge of borehole drilling and testing. Knowledge of bricklaying. Knowledge of carpentry. Knowledge of welding. Knowledge of pipelaying. Knowledge of electrical work related to water and sanitation services. Knowledge of mechanical work related to water and sanitation services. Knowledge of operations of small plant.

Table 5: Experiential Competency : Head of Water Services Operation and Maintenance

Experiential Competency : Head of Water Services Operation and Maintenance (Water and/or Sanitation Reticulation) Manager O&M (Area Manager, Water)			
Function	**Competency Cluster**	**Competency**	**Skills**
1.1 Functional Management	Business Management	Strategic Thinking	Manage the technical and/or W&S O&M sub-directorate/section. Manage and report on the performance of water supply, sewer collection and infrastructure. Determine and manage a financial budget for O&M. Knowledge of "SMART" water in relation to long-term planning options i.e., knowledge of IT and communications technology as related to W&S services especially monitoring or controlling devices and meters. Establish/fill an organogram with required staff and expertise for O&M. Oversee and/or manage performance assessments of O&M staff. Contribute to identifying the training needs of O&M staff. Manage external customers regarding O&M coordination. Manage internal customers regarding O&M coordination. Knowledge of relevant supply chain management regulations and rules. Knowledge of safety legation. Knowledge of various software applications used to track O&M complaints, call outs, stock levels, work efficiency and more.
1.2 Water Services Operations and Maintenance	W&S Bulk O&M	O&M of Bulk Infrastructure	Calculate annual operating, maintenance and repair budgets. Interpret raw water licence conditions. Control raw water take-off within licence conditions. Operate all aspects of water and sanitation infrastructure and networks. Develop operating rules. Source appropriate equipment for flow and pressure logging. Conduct Positive Displacement Test (PDT) of reservoirs. Interpret hydraulic modelling results and compare to actual system operational performance. Implement preventative maintenance servicing of pumps and motors. Implement corrective maintenance activities (breakdowns). Maintain, check the operation of, and test bulk meters. Maintain and check the operation of air valves and scour valves. Maintain and check the operation of a telemetry system. Maintain and check the operation of electrical switchgear. Maintain sites e.g., paint buildings, grass, fences, walkways and roads. Repair pipelines and auxiliary works. Repair mechanical equipment. Repair electrical equipment. Commission new and modified bulk equipment.
		O&M of Treatment Works	Calculate annual operating, maintenance and repair budgets. Manage the overall treatment work(s) function (to comply with legislation). Maintain plant performance and maintenance process records. Undertake process(es) to optimise works. Manage corrective maintenance activities (breakdowns) as required. Troubleshoot process failures on WTW. Undertake investigations related to non-conformance of WTWs. Order and control use of chemicals and maintain stores inventory. Set dosages and chemical feed rates in line with inflow rates and water quality. Interpret water quality results to identify adjustments to chemical additives and plant operations. Maintain site(s). Check operation of all valves and valve stem packing. Backwash filters. Remove silt, clarifier, sedimentation and filter sludge. Treat clarifier and filter sludge. Implement preventative maintenance servicing of pumps and motors. Clean grit channels. Operate a sludge treatment plant. Remove accumulated sludge from sludge plant. Maintain electrical switchgear. Knowledge of relevant legislation and regulations. Knowledge of the implications of chemical pollution on the environment.

Experiential Competency : Head of Water Services Operation and Maintenance (Water and/or Sanitation Reticulation) Manager O&M (Area Manager, Water)			
Function	**Competency Cluster**	**Competency**	**Skills**
		Scientific Services	Take samples of water and wastewater. Test raw water influent to WTW. Analyse raw water quality to determine treatment requirements. Test treated water to ensure compliance with potable water quality standards. Recommend adjustments to treatment processes. Develop statistical process control charts. Interpret statistical process control charts. Knowledge of ISO 9000 Quality Management System.
	W&S Networks O&M	O&M of Networks including Small Pumps	Calculate annual operating, maintenance and repair budgets. Inspect water mains. Inspect water mains pipe connections. Inspect pipe bridges. Inspect equipment. Inspect manholes. Install, calibrate and operate flow meters and telemetry system. Calibrate flow meters. Refurbish and replace infrastructure. Construct and repair manholes. Construct and repair inspection chambers. Provide customer connections, valves and meters. Repair pipe breaks in reticulation network. Flush and disinfection of repaired sections Manage fluctuating water levels and pressures. Write start up procedures for all pumps. Implement start up procedures for all pumps. Write shut down procedures for all pumps. Implement shut down procedures for all pumps. Read and record flow measuring equipment. Test and replace flow measuring equipment. Repair electrical cables. Replace electrical gauges. Maintain electrical motors. Maintain diesel generators and motors. Maintain pumps and valves. Maintain pump station buildings including fencing. Supervise assets. Undertake audits of tools and equipment. Verify and sign off subcontractors completed work. Verify that meters are correctly installed. Advise on when meters must be calibrated. Identify where additional meters are required. Identify when meters need to be repaired and notify relevant parties. Capture meter readings using applicable software. Produce meter readings reports using applicable software.
		Electrical Works in O&M	Join electrical cables. Terminate electrical cables. Lay cables below ground. Lay cables on racks. Install overhead cabling. Install small transformers ensuring correct phasing. Install large transformers ensuring correct phasing. Assemble oil coolers on transformers. Assemble bushings on large transformers. Install low voltage switchgear less than 3.3kV. Install high voltage switchgear greater than 3.3kV. Install electric motors ensuring correct phasing. Install electric motor controls and instrumentation. Install small single phase submersible pumps and control box. Select appropriate distribution boards and installation of circuit breakers. Select, test and install earthing equipment. Knowledge of installation rules as per SANS 10142.
		Safety, Health, Environmental and Quality Management (SHEQ) in O&M	Write safety specifications. Develop a SHEQ plan. Conduct a SHEQ risk assessment. Appoint and train a SHEQ officer. Train a health and safety team. Purchase and maintain required first aid equipment. Implement all safety procedures according to prescribed systems (OHSAS 18001 or ISO 9001). Maintain a safety file. Conduct health and safety audits. Report accidents and injuries to relevant authorities. Analyse trends in accidents and causes of specific accidents. Conduct advocacy and awareness sessions with staff. Manage the security of people and buildings.

Experiential Competency : Head of Water Services Operation and Maintenance (Water and/or Sanitation Reticulation) Manager O&M (Area Manager, Water)			
Function	**Competency Cluster**	**Competency**	**Skills**
			Knowledge of environmental stresses e.g., dust, noise, heat, ergonomics. Knowledge of legislative requirements. General knowledge of Environmental Impact Assessment legislation as per NEMA. Knowledge of SHEQ systems i.e., policy, procedures, work instructions etc. Scope the work, compile tender documents, adjudicate bids and appoint service providers. Carry out WTW/WWTWs plant housekeeping to the required standards.
		Water loss Management	Write a NRW strategy and plan. Calculate NRW programme expenses and cost savings (planned and actual) Interpret water loss management reports and technical information. Examine sector flow meter records to identify high usage or sudden changes. Examine and conduct data analysis on consumer billing records. Determine water balances as per IWA. Conduct site-specific inspections to identify leakage points. Appoint contractors to repair or adjust infrastructure. Monitor contractors work and approve payments. Write customer-focused water loss awareness material. Advertise and promote water loss management material. Encourage public to report water losses from municipal systems.
	W&S Incident Management	W&S Management in Floods and Droughts	Identify risk to infrastructure and water supply during floods and droughts. Plan for emergency water source provision to disaster-affected communities. Identify local service providers with short-notice equipment availability. Negotiate assistance from fire and emergency services and other organisations. Manage implementation of emergency water provision to affected communities. Design and implement transition from emergency water supply to at least the previous service level.
		W&S Infectious Disease Outbreak Response	Plan for emergency water supply provision to disaster-affected communities. Assess immediate emergency water supply requirements. Implement emergency water supply provision to disaster affected communities. Identify pathogen(s) with health department and source of outbreak. Identify transmission route with health department. Conduct awareness training on disease transmission route(s). Design transition from emergency water supply provision to at least previous service level.
		W&S Pollution Response	Identify the chemical, physical, microbiological and ecological impact of different pollutants on the human and aquatic environment. Recommend environmental management plans for activities with a water pollution risk. Decide when, and issue warnings to affected water users to refrain from using polluted water. Manage illegal contraventions. Manage emergency control measures in the case of accidental spillage.
	Fleet Management for O&M		Identify correct fleet requirements and kitting out of vehicles/trucks. Write specifications for purchase or lease of vehicles. Follow supply chain management rules to secure fleet and fleet maintenance. Manage and oversee a fleet management system. Manage and oversee a vehicle tracking software system. Knowledge of vehicles and maintenance requirements. Carry out minor service on petrol vehicles. Carry out minor service on diesel vehicles. Troubleshoot on engine compartment using diagnostic machines. Maintain vehicle diesel engines. Maintain vehicle petrol engines. Fix and overhaul vehicle clutch. Fix and overhaul gearbox and differential. Fix and overhaul a vehicle engine cylinder head. Replace cam belt and adjust timing. Overhaul the entire vehicle engine. Maintain and repair pneumatic brake systems. Maintain and repair tractor brakes.

Experiential Competency : Head of Water Services Operation and Maintenance (Water and/or Sanitation Reticulation) Manager O&M (Area Manager, Water)			
Function	**Competency Cluster**	**Competency**	**Skills**
			Knowledge of auto-electrical wiring systems. Fix and replace general parts such as shocks, brakes, axle and lights. Balance wheels using a wheel balancing machine. Align wheels using a wheel alignment machine. Grease relevant parts on TLBs and excavators. Replace skidders and blades on slashers. Tension and grease chains on sludge trailers.

Annexure B: Referenced Documents

Electronic copies of the following referenced documents can be found and downloaded from https://ws.dws.gov.za/iris/documents.aspx)

Guidelines for Greywater use and management in South Africa, Water Research commission Report no TT746/17, March 2018

Guideline for the preparation of an IWA water balance to determine Non-Revenue water and water losses (Department of Water and Sanitation 2014)

Integrated Water Sector Skills Intervention Map Based on a Sector Skills Gap Analysis, Water Research Commission Report 2113/1/14, March 2015

Maintenance management standard for immovable assets www.publicworks.gov.za May 2017.

Part 3 (Emergency Housing Programme) of the National Housing Code, Volume 4 (Department of Human settlement (2009)

The Guideline Professional Fees (Scope of Services and Tariff of Fees for Persons Registered in terms of the Engineering Profession Act, 46 of 2000) can be accessed from https://www.ecsa.co.za/regulation/SitePages/Guideline%20Fees.aspx

Wastewater Risk Abatement Plan, A W_2RAP guideline, Water Research Commission Report TT 489/11, June 2011

Water borne sanitation operations and maintenance guide, Water Research Commission Report TT 482/11, March 2011

Water Services Infrastructure Asset Management Strategy (Department of Water and Sanitation 2011)