SOUTH AFRICAN QUALIFICATIONS AUTHORITY

REGISTERED QUALIFICATION:

Occupational Certificate: Water Infrastructure Manager

SAQA QUAL ID	QUALIFICATION TITLE			
104623	*Occupational Certificate: Water Infrastructure Manager*			
ORIGINATOR				
Development Quality Partner - LG SETA (Business)				
PRIMARY OR DELEGATED QUALITY ASSURANCE FUNCTIONARY			**NQF SUB-FRAMEWORK**	
-			*OQSF - Occupational Qualifications Sub-framework*	
QUALIFICATION TYPE	**FIELD**		**SUBFIELD**	
Occupational Certificate	*Field 03 - Business, Commerce and Management Studies*		*Generic Management*	
ABET BAND	**MINIMUM CREDITS**	**PRE-2009 NQF LEVEL**	**NQF LEVEL**	**QUAL CLASS**
Undefined	*304*	*Not Applicable*	*NQF Level 08*	*Regular-ELOAC*
REGISTRATION STATUS		**SAQA DECISION NUMBER**	**REGISTRATION START DATE**	**REGISTRATION END DATE**
Registered		*EXCO 05164/18*	*2018-09-12*	*2023-09-12*
LAST DATE FOR ENROLMENT		**LAST DATE FOR ACHIEVEMENT**		
2024-09-12		*2027-09-12*		

In all of the tables in this document, both the pre-2009 NQF Level and the NQF Level is shown. In the text (purpose statements, qualification rules, etc), any references to NQF Levels are to the pre-2009 levels unless specifically stated otherwise.

This qualification does not replace any other qualification and is not replaced by any other qualification.

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:
The purpose of this qualification is to prepare a learner to operate as a Water Infrastructure Manager. A Water Infrastructure Manager manages physical assets throughout its lifecycle to ensure optimal return on investment by planning, developing and controlling over the acquisition, operations and maintenance of water infrastructure assets to minimise their related risks and costs over their entire life-cycle.

A qualified learner will be able to:
- *Update or develop a Water Services Development Plan using the approved system.*
- *Identify, design and develop water infrastructure programmes and projects.*
- *Coordinate, monitor and control of operational tasks relating water infrastructure.*
- *Develop and manage the water infrastructure operations and maintenance programme.*
- *Monitor, update and maintain the management information system.*

Rationale:
Water is an essential resource that is increasingly in demand to sustain life. Many countries including South Africa are facing challenges relating to ineffective water infrastructure management on existing

infrastructure, poor planning for new infrastructure, and poor infrastructure asset management (life-cycle management). Adequate and well-maintained water and sanitation infrastructure is an essential component for economic growth to improve the quality of life and poverty reduction. Municipalities are mandated by the constitution to provide all South Africans with effective, affordable, safe water supply services and therefore remain as the custodians of water services infrastructure assets in the water sector.

Infrastructure has a lifespan in which the age, physical condition, and efficiency of the existing infrastructure require continuous inspection and maintenance to ensure that water is supplied adequately and efficiently without disruption. The South African municipalities are working hard to move towards greater infrastructure sustainability thus investing and reinvesting in water infrastructure. Generally, water infrastructure systems are out-of-sight and sometimes out-of-mind which make them subject to neglect. Managing the asset throughout its lifecycle effectively from both a financial and operational perspective will help the government to achieve the best return on the asset, maintain asset condition and service level, and reduce or avoid unnecessary service interruptions. Water infrastructure managers should play a key role in asset management throughout an asset life cycle and need to be trained to deal with ongoing considerations of planning for the costs of ongoing asset management, optimising maintenance and renewal expenditures, coordinating renovation projects, and sustaining long-term asset performance to ensure proper planning and development, managing the operations and maintenance of the water infrastructure for efficient and sustainable water and sanitation services to all consumers as well as the minimisation of water loss and improve hygiene.

The need to develop the capacity for effective and sustainable water infrastructure management is crucial to provide a high quality, adequate and reliable water services. This qualification has been identified as a priority for skills development to provide learners with requisite knowledge and skills in both technical and management facets to manage the water infrastructure in the workplace. Learners who have successfully completed this qualification will provide an acceptable level of water infrastructure service to meet the needs of the customers by applying water infrastructure management principles and practices. The qualification is aimed at people who are already working or intend to work in the water sector at national, provincial and local spheres of government including the private sector. The qualification will provide access to a recognised career path within the water sector.

LEARNING ASSUMED TO BE IN PLACE AND RECOGNITION OF PRIOR LEARNING

Recognition of Prior Learning (RPL):
RPL for access to the external integrated summative assessment: Accredited providers and approved workplaces must apply the internal assessment criteria specified in the related curriculum document to establish and confirm prior learning. Accredited providers and workplaces must confirm prior learning by issuing a statement of result or certifying a work experience record.

RPL for access to the qualification: Accredited providers and approved workplaces may recognise prior learning against the relevant access requirements.

Entry Requirements:
- *National Diploma: Engineering.*

RECOGNISE PREVIOUS LEARNING?

Y

QUALIFICATION RULES

This qualification is made up of the following compulsory Knowledge, Practical Skill, and Work Experience Modules:

Knowledge Modules:
- *121903001-KM-01, Legislation, regulations, policies and guidelines applicable to water infrastructure management, Level 8, 10 Credits.*
- *121903001-KM-02, Water infrastructure management and operations, Level 8, 20 Credits.*
- *121903001-KM-03, Water infrastructure project management, Level 7, 5 Credits.*
- *121903001-KM-04, Water infrastructure management and financing, Level 8, 5 Credits.*
- *121903001-KM-05, Leadership in water infrastructure management, Level 8, 5 Credits.*
- *121903001-KM-06, Water conservation and demand management, Level 8, 8 Credits.*
- *121903001-KM-07, Operations and Maintenance Optimisation, Level 9, 15 Credits.*
- *121903001-KM-08, Water Infrastructure Asset Management, Level 8, 15 Credits.*
- *121903001-KM-09, Risk Management for water infrastructure and Safety, Level 8, 10 Credits*
- *121903001-KM-10, Integrated water information management system, Level 7, 8 Credits.*

Total number of credits for Knowledge Modules: 101.

Practical Skill Modules:
- *121903001-PM-01, Manage water services operations, Level 8, 25 Credits.*
- *121903001-PM-02, Develop a water infrastructure operation strategy and maintenance plan, Level 8, 20 Credits.*
- *121903001-PM-03, Establish water infrastructure needs, Level 8, 18 Credits.*
- *121903001-PM-04, Develop and implement water infrastructure-related projects, Level 8, 20 Credits.*
- *121903001-PM-05, Commission water infrastructure projects, Level 8, 5 Credits.*
- *121903001-PM-06, Integrate and use information for optimal management of water infrastructure performance, Level 7, 5 Credits.*
- *121903001-PM-07, Manage water balance, Level 8, 15 Credits.*
- *121903001-PM-08, Update or develop a water services development plan, Level 8, 5 Credits.*

Total number of credits for Practical Skill Modules: 113.

Work Experience Modules:
- *121903001-WM-01, Integrated Development Planning process, Level 8, 15 Credits.*
- *121903001-WM-02, Technical design modelling processes, Level 8, 20 Credits.*
- *121903001-WM-03, Operational processes and protocols, Level 8, 25 Credits.*
- *121903001-WM-04, Water infrastructure operations and maintenance processes, Level 9, 20 Credits.*
- *121903001-WM-05, Information management processes, Level 8, 10 Credits.*

Total number of credits for Work Experience Modules: 90.

EXIT LEVEL OUTCOMES

1. Evaluate, consolidate information and populate a Water Services Development Plan.
2. Manage water consumption and demand to achieve a sustainable water supply to end-users.
3. Manage the operations and maintenance of the water infrastructure system.
4. Use various information management systems to monitor, update and maintain sustainable water supply to the end-users.
5. Plan and implement water infrastructure project.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:
- *The role and significance of a water services development plan and its relationship with the integrated development plan is explained in line with applicable legislation.*
- *Information is gathered from relevant sources, evaluated and prioritised in terms of importance and relevance.*
- *A Water Services Development Plan is updated or developed using the approved system in accordance with legislative and organisational policies requirements.*
- *An excerpt from the Water Services Development Plan is populated correctly in accordance with legislative and organisational policy requirements.*

Associated Assessment Criteria for Exit Level Outcome 2:
- *The concept of water balance is explained in terms of its importance in maintaining sustainable water supply.*
- *The significance of a Water Management Plan is explained in relation to best practice of managing the water network in line with national guidelines.*
- *Strategies for managing water demand to deal with water crisis are discussed in line with integrated water resources management framework for the utilisation and protection of water resources among competing end-users.*
- *Different approaches are identified and evaluated for the improvement in technical efficiency of water use and efficient allocation of water use among competing end-users.*
- *Using a diagram, the purpose of balancing water volumes is explained.*
- *Using data and diagram, trends in the analysis of water loss information is explained.*
- *Various methods and reasons for collecting data are explained and meter readings and flow data are recorded as part of checking water balances using a diagram.*
- *Reasons for arranging a zonal logging procedure are explained with examples.*
- *Given case scenarios, the concept of accurately recording minimum night flow is explained by means of a diagram.*
- *Different measures and strategies employed in water demand management are explained.*
- *The various approaches on supplying water to indigent consumers are discussed and its impact on water demand management.*
- *The concepts of Blue-Drop and No-Drop are explained in terms of their significance within the context of water demand management.*

Associated Assessment Criteria for Exit Level Outcome 3:

- *Best practice on the operational management of water infrastructure components are analysed and applied on water infrastructure systems.*
- *An operation and maintenance plan of the entire water infrastructure system is developed and it is aligned to the various operational manuals of the components including pumps, valves, pipes, meters and treatment works.*
- *Given case studies, operational tasks and challenges are identified, analysed and appropriate recommendations are made to address the challenges.*

Associated Assessment Criteria for Exit Level Outcome 4:
- *The various information management systems are identified and explained in terms of their uses and differences.*
- *Concepts, tools and equipment related to information and communication technology are explained in terms of their impact on the water network.*
- *The information management system to operate and maintain the water infrastructure network is explained in terms of its uses, advantages and disadvantages.*
- *Results of logging technology are retrieved and interpreted to resolve irregularities in the water supply system.*
- *Given a sketch of a water tower or reservoir, different technologies used to inform or measure the performance of water towers and reservoirs are explained.*

Associated Assessment Criteria for Exit Level Outcome 5:
- *Data relating to water infrastructure is obtained and analysed to determine infrastructure needs and classified in terms of new, refurbishment, maintenance or upgrading of infrastructure.*
- *Details on the conditions of the water infrastructure, pipe age, burst history, and pump performance are provided to ensure a more holistic understanding of the system.*
- *Water infrastructure projects are prioritised according to identified needs.*
- *Given a case scenario, a project proposal is compiled and it includes details such as resources, budgets, recommendations and presented to the relevant stakeholders for approval.*
- *Given case study, various elements and steps are considered in conducting a feasibility study are outlined and indicators are related to water consumption, infrastructure conditions, costs, and water quality in a given scenario.*
- *The importance of exercising oversight in the implementation of water infrastructure projects is explained in relation to hand-over and commissioning the project.*

Integrated Assessment:
Integrated Formative Assessment:
The skills development provider will use the curriculum to guide them on the stipulated internal assessment criteria and weighting. They will also apply the scope of practical skills and applied knowledge as stipulated by the internal assessment criteria. This formative assessment leads to entrance into the integrated external summative assessment.

Integrated Summative Assessment:
An external integrated summative assessment, conducted through the relevant Quality Council for Trades and Occupations (QCTO) Assessment Quality Partner is required for the issuing of this qualification. The external integrated summative assessment will focus on the Exit Level Outcomes and Associated Assessment Criteria.

INTERNATIONAL COMPARABILITY

This qualification is aligned to international norms and standards in water regulation (e.g. the Southern African Development Community (SADC) Revised Protocol on Shared Watercourses which is linked to the Helsinki Rules on the Uses of the Waters of International Rivers). A comparison was conducted in countries with best practice on water infrastructure asset management training and development at international and regional levels. The comparison focused on countries with qualifications frameworks, professional development programmes, learning programmes, apprenticeships and short courses targeting water infrastructure managers. Countries searched included Australia and the United States of America. The results of the search in all the countries visited indicate that there are no qualifications on water infrastructure asset management at the level of this qualification other than short certificate courses with the duration ranging from 6 days to 10 weeks.

United States of America (USA):
Wisconsin University's Department of Engineering Professional Development offers the Advanced Asset Management Practices for Water and Wastewater Utilities course which is an eighteen credit professional development short course offered across the U.S aimed at water and wastewater managers, financial officers and capital program managers, directors, and commissioners, current and upcoming utility leaders, federal agencies and military bases, regulators and consultants giving them competencies on prioritising and managing water and wastewater assets and how to improve the long-term physical and financial health of

the system. Participants learn on how to apply asset management principles, asset life-cycle, strategies, ISO 55000 asset management standards, asset registers, risk, and state-of-the-art practices from across the states. The course compares with the South African qualification in terms of content and differs significantly with the South African qualification in terms of duration as the local offering has a unique curriculum structure which is clearly distinguishable into knowledge/theory, practical skills and workplace experience module specifications.

Conclusion:
The US short course content is comparable with the South African qualification as it covers some of the modular content and also incorporates knowledge and practical skills in which learning is project-based and requires learners to undertake real-life engineering tasks thus putting the theoretical knowledge into practice (comparable delivery methodology). However, it differs significantly in terms of the duration.

ARTICULATION OPTIONS

This qualification articulates horizontally with the following qualifications:
- *Bachelor of Engineering: Civil Engineering, SAQA ID: 73784, Level 8.*
- *Bachelor of Science in Engineering in Civil Engineering, SAQA ID: 13974, Level 8.*

This qualification articulates vertically with the following qualification:
- *Master of Engineering in Civil Engineering, SAQA ID: 73986, Level 9.*

MODERATION OPTIONS

N/A

CRITERIA FOR THE REGISTRATION OF ASSESSORS

N/A

NOTES

Qualifying for external assessment:
N/A

Additional legal or physical entry requirements:
N/A

Criteria for the accreditation of providers.
- *Accreditation of providers will be done against the criteria as reflected in the relevant curriculum on the Quality Council for Trades and Occupations (QCTO) website.*

The curriculum title and code is:
121903001: Water Infrastructure Manager.

This qualification encompasses the following trades as recorded on the National Learners' Records Database (NLRD):
N/A

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION:

NONE

PROVIDERS CURRENTLY ACCREDITED TO OFFER THIS QUALIFICATION:

This information shows the current accreditations (i.e. those not past their accreditation end dates), and is the most complete record available to SAQA as of today. Some Primary or Delegated Quality Assurance Functionaries have a lag in their recording systems for provider accreditation, in turn leading to a lag in notifying SAQA of all the providers that they have accredited to offer qualifications and unit standards, as well as any extensions to accreditation end dates. The relevant Primary or Delegated Quality Assurance Functionary should be notified if a record appears to be missing from here.

NONE