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CONTENTS

Page

GOVERNMENT NOTICES

No. 268	Commencement of Water Resources Management Act, 2013	1
No. 269	Water Resources Management Regulations: Water Resources Management Act, 2013	2

Government Notices

MINISTRY OF AGRICULTURE, WATER AND LAND REFORM

No. 268

2023

COMMENCEMENT OF WATER RESOURCES MANAGEMENT ACT, 2013

Under section 134(1) of the Water Resources Management Act, 2013 (Act No. 11 of 2013), I determine that that Act comes into operation on the date of publication of this notice in the *Gazette*.

C-H. SCHLETTWEIN
MINISTER OF AGRICULTURE,
WATER AND LAND REFORM

Windhoek, 12 June 2023

MINISTRY OF AGRICULTURE, WATER AND LAND REFORM

No. 269

2023

**WATER RESOURCES MANAGEMENT REGULATIONS:
WATER RESOURCES MANAGEMENT ACT, 2013**

Under section 129(1) of the Water Resources Management Act, 2013 (Act No. 11 of 2013) and, where applicable under section 35 of that Act, with the concurrence of the Minister of Health and Social Services, I have made the regulations set out in the Schedule.

C-H. SCHLETTWEIN
MINISTER OF AGRICULTURE,
WATER AND LAND REFORM

Windhoek, 12 June 2023

SCHEDULE**ARRANGEMENT OF REGULATIONS****PART 1****PRELIMINARY**

1. Definitions

PART 2**PRICING POLICY FOR SERVICES IN WATER SECTOR**

2. Pricing policy for services in water sector regarding norms and standards for fixing of tariffs of fees and charges for services

PART 3**BASIN MANAGEMENT COMMITTEES**

3. Manner of notification of proposed recognition of basin management committee

PART 4**WATER MANAGEMENT STANDARDS AND LICENSED LABORATORIES**

4. Water quality standards in respect of water supply for drinking and household purposes
5. General criteria for quality of recycled water
6. Requirements for evaluating and approving processes and designs for treatment of potable water before issuing of licence for water treatment facility
7. Requirements for persons engaged in operating water treatment facility
8. Minimum standards of water supply services to be complied with by water services providers and owners of water treatment facilities
9. Requirements for persons engaged for operating waterworks used for supplying water for domestic, commercial, industrial or agricultural use
10. Licensing and audit team
11. Prohibition on testing and ascertaining quality of water supply without being licensed

12. Application for licensing of privately owned laboratory to test and ascertain quality of water supply
13. Referral of application for licensing of privately owned laboratory to licensing and audit team for consideration
14. On-site audit
15. Report regarding continued licensing of licensed laboratory
16. Quality assurance plan
17. Manager of licensed laboratory
18. Quality manager
19. Document control
20. Subcontracting of work
21. Complaints and corrective action
22. Internal audits and corrective action
23. Review by manager
24. Technical requirements
25. Laboratory facilities
26. Environmental conditions and access control
27. Microbiological laboratories
28. Instrumentation and analytical support equipment
29. Instrumentation and equipment for chemical laboratories
30. Microbiological laboratories
31. Asset management
32. Collection of samples
33. Handling of samples
34. Preservation of samples
35. Test items
36. Use of approved analytical methods
37. Minimum testing capability
38. Quality control for validity of test results
39. Manager of licensed laboratory
40. Laboratory analyst
41. Laboratory technician
42. Administrative and support staff

PART 5

WATER SERVICES, ABSTRACTION AND USE LICENSES

43. Application for licence as water services provider
44. Application for licence to abstract and use water
45. Renewal of licence to abstract and use water
46. Application for borehole licence
47. Application for groundwater disposal licence

PART 6

PROCEDURES AND CONDITIONS FOR ARTIFICIAL RECHARGE OF AQUIFERS

48. Authorisation for exploration and drilling in order to establish boreholes for artificial recharge of aquifers
49. Authorisation to store ground water in artificial recharge scheme and application for licence to store ground water in artificial recharge scheme

50. Authorisation for abstraction of groundwater from artificial recharge scheme
51. Pre-feasibility phase and pre-feasibility study
52. Feasibility study
53. Approval to proceed with operation of artificial recharge scheme
54. Implementation of artificial recharge scheme
55. Operation and maintenance
56. Renewal of approval to operate artificial recharge scheme
57. Risk assessment
58. Incident occurrence
59. Protection of aquifers
60. Water quality standards and monitoring
61. Retention period
62. Treatment

PART 7

DRILLER'S LICENCES

63. Categories of driller's licences and technical requirements for persons to be eligible for driller's licence of specified category
64. Application for driller's licence
65. Contravention of, non-compliance with, or causing or permitting of person to contravene, condition to which driller's licence is subject

PART 8

WATER POLLUTION CONTROL

66. Application for licence to discharge effluent or construct or operate wastewater treatment facility or waste disposal site
67. Quality standards with which effluent discharges must comply
68. Requirements relating to the reclamation and recycling of potable water from treated wastewater
69. Re-use of treated wastewater
70. Renewal of licence to discharge effluent or construct or operate wastewater treatment facility or waste disposal site
71. Application fee for transfer of licence to discharge effluent or construct or operate wastewater treatment facility or waste disposal site

PART 9

DAMS, DAM SAFETY AND FLOOD MANAGEMENT

72. Classification of dams
73. Requirements for construction, maintenance or repairing of dams
74. Design report in respect of Category 1 dam
75. Engineering drawings in respect of Category 1 dam
76. Safety of existing development affected by Category 1 dam
77. Additional information with regard to design report, engineering drawings and safety of existing development affected by Category 1 dam
78. Design report in respect of Category 2 dam
79. Project specifications in respect of Category 2 dam
80. Engineering drawings in respect of Category 2 dam

81. Safety of existing development affected by Category 2 dam
82. Additional information related to design report, project specifications, engineering drawings and safety of existing development affected by Category 2 dam
83. Professional team and independent experts
84. Design report in respect of Category 3 dam
85. Project specifications in respect of Category 3 dam
86. Engineering drawings in respect of Category 3 dam
87. Safety of existing development affected by Category 3 dam
88. Additional information related to design report, project specifications, engineering drawings and safety of existing development affected by Category 3 dam
89. Dam safety evaluation in respect of Category 1 dam
90. Dam safety evaluation in respect of Category 2 dams and Category 3 dams
91. Additional requirements for dam safety evaluation in respect of Category 3 dam
92. Registration of existing dams
93. Register of registered dams
94. Registration of dam with safety risk
95. Keeping of records, storage of documents, change of ownership and change of use of dam with safety risk
96. Particulars to be contained in register of dams with safety risk
97. Manner and extent of monitoring of dams with safety risk
98. Operation and maintenance manual in respect of a dam with safety risk
99. Emergency preparedness plan for dam with safety risk

PART 11

CONTROL OF ACTIVITIES AFFECTING WETLANDS, WATER RESOURCES AND RESOURCE QUALITY

100. Application for licence for use of wetland or dam
101. Consideration of application for licence for use of wetland or dam
102. Conditions relating to licence for use of wetland or dam
103. Licence for use of wetland or dam
104. Duration of licence for use of wetland or dam
105. Renewal of licence for use of wetland or dam
106. Review and amendment of licence for use of wetland or dam
107. Suspension or cancellation of licence for use of wetland or dam
108. Procedure upon expiry or cancellation of licence for use of wetland or dam
109. Licence for use of wetland or dam not transferable
110. Prohibited use of wetland or dam
111. Offences and penalties relating to use of wetland or dam without licence

PART 12

REMOVAL OF ROCKS, SAND OR GRAVEL FROM WATERCOURSE FOR SALE OR COMMERCIAL EXPLOITATION

112. Prohibition on removal of rocks, sand or gravel from watercourse for sale or commercial exploitation without licence
113. Publication of intention to apply for licence
114. Application for licence for removal of rocks, sand or gravel
115. Consideration of application for licence for removal of rocks, sand or gravel
116. Criteria upon which licence for removal of rocks, sand or gravel may be issued
117. Licence for removal of rocks, sand or gravel

118. Terms and conditions of licence for removal of rocks, sand or gravel
119. Renewal of licence for removal of rocks, sand or gravel
120. Review, amendment, suspension or cancellation of licence for removal of rocks, sand or gravel
121. Effect of expiry or cancellation of licence for removal of rocks, sand or gravel
122. Licence for removal of rocks, sand or gravel not transferable
123. Offences and penalties relating to removal of rocks, sand or gravel without licence or in contravention of licence conditions

PART 13

CONTROL OF AQUATIC INVASIVE SPECIES

124. Declaration of certain species to be alien invasive species
125. Prohibition of importation, transport and spreading of prohibited alien invasive species
126. Application for licence to import, transport or spread restricted alien invasive species
127. Consideration of application for licence to import, transport or spread restricted alien invasive species
128. Conditions relating to licence to import, transport or spread restricted alien invasive species
129. Licence to import, transport or spread restricted alien invasive species
130. Duration of licence to import, transport or spread restricted alien invasive species
131. Renewal of licence to import, transport or spread restricted alien invasive species
132. Review and amendment of licence to import, transport or spread restricted alien invasive species
133. Suspension or cancellation of licence to import, transport or spread restricted alien invasive species
134. Procedure upon expiry or cancellation of licence to import, transport or spread restricted alien invasive species
135. Licence to import, transport or spread restricted alien invasive species not transferable
136. Offences and penalties relating to prohibited or restricted alien species

PART 14

PROTECTION OF RIPARIAN ZONES

137. Definition of “riparian species” and “riparian zone”
138. Prohibition on removal of riparian species, filling or excavation of riparian zone or erection of structural development within riparian zone without licence
139. Application for licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone
140. Consideration of application for licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone
141. Conditions relating to licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone
142. Licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone
143. Duration of licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone
144. Renewal of licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone
145. Review and amendment of licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone
146. Suspension or cancellation of licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone

147. Procedure upon expiry or cancellation of licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone
148. Licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone not transferable
149. Offences and penalties relating to removal of riparian species, filling or excavation of riparian zone or erection of structural development within riparian zone

PART 15

WATER SERVICES PROVIDED BY STATE

150. Penalty fee leviable and recoverable against user in default of payment of fees and charges owing to State

ANNEXURES

PART 1

DEFINITIONS

Definitions

1. In these regulations word or an expression to which a meaning has been assigned in the Act has that meaning, and unless the context otherwise indicates -

“acceptable standard” means water with good quality or low health risk and acceptable for human consumption;

“aquifer recharge” means the injection of water into an injection borehole or well in order to replenish water in aquifers;

“artificial recharge scheme” means a large-scale plan for augmenting the amount of groundwater available through works designed to increase the natural replenishment or percolation of surface waters into the groundwater aquifers;

“assessment report” means an assessment report as defined in section 1 of the Environmental Management Act;

“bachelor’s degree” means an undergraduate academic degree -

- (a) awarded to a person by an NQA accredited institution when the person has completed a course of study over a period of at least two or more years; or
- (b) accredited by the NQA under section 3(f) of the Namibia Qualifications Authority Act, 1996 (Act No. 29 of 1996);

“catchment parameters” means features such as -

- (a) the topography average slope of the longest watercourse;
- (b) the average slope of the catchment area;
- (c) the catchment shape and distance from its origin to its terminus;

- (d) the vegetation type and coverage; and
- (e) particulars of the geology such as sandy or dolomitic condition;

“Category 1 dam”, “Category 2 dam” or “Category 3 dam” means a dam classified as such as contemplated in regulation 72;

“Disaster Risk Management Act” means the Disaster Risk Management Act, 2012 (Act No. 10 of 2012);

“early warning notification” means to -

- (a) effectively disseminate alerts and ensure there is constant state of readiness;
- (b) actively involve the communities at risk; and
- (c) facilitate public education and awareness of risks;

“emergency”, in respect of a dam with a safety risk, means an imminent, expected, foreseen, anticipated or actual sudden release of water from such a dam as a result of a natural disaster, an accident, a condition affecting the safety of the dam or a failure of the dam or a part of the dam;

“emergency preparedness plan” means -

- (a) a series of action steps set for mitigating any -
 - (i) damage to a dam; or
 - (ii) any loss or injury which may result from any damage to a dam; or
- (b) a plan contemplated in regulation 99 which -
 - (i) identifies potential emergency conditions at a dam with a safety risk and specifies pre-planned actions to be taken to minimise injury or loss of life, damage to property or any other adverse effects;
 - (ii) describes actions that the owner of the dam or person in control must take to address safety issues;
 - (iii) contains appropriate information and procedures to assist the owner of the dam to issue an early warning notification to the responsible disaster management committees, representatives of regional and local authorities, other representative bodies or any communities potentially threatened by the condition of the dam and with whom arrangements have been made in connection with the issue of warnings; and
 - (iv) contains engineering drawings of the dam and inundation maps to show disaster management authorities critical areas for action in case of an emergency;

“environmental clearance certificate” means an environmental clearance certificate as defined in section 1 of the Environmental Management Act;

“Environmental Impact Assessment Regulations” means the Environmental Impact Assessment Regulations published under Government Notice No. 30 of 6 February 2012;

- “Environmental Management Act” means the Environmental Management Act, 2007 (Act No. 7 of 2007);
- “environmental plan” means an environmental plan as defined in section 1 of the Environmental Management Act;
- “failure” in respect of dam, means the collapse or displacement of a part of a dam or its foundation, so that the dam cannot retain water;
- “floodplain” means land subject to seasonal inundation from high floods spilling over the banks of an adjacent watercourse;
- “full supply level” means -
- (a) in the case of a dam where the outflow is not wholly or partly controlled by movable gates, siphons or by other means, the level at the dam where the dam is considered to be 100% full under normal operating conditions;
 - (b) in the case of a dam where the outflow is wholly or partly controlled by movable gates, siphons or by other means, the maximum level at the dam to which water may rise under normal operating conditions, exclusive of any provision for flood surcharge;
- “hazard potential” means a qualitative indication of the potential injury, loss of life, economic loss or adverse impact on resource quality, that any failure of a dam with a safety risk may cause;
- “ideal guideline” means water with an excellent quality because it meets all the high water quality guidelines and standards for potable water set out in Annexure 1;
- “licensed laboratory” means a privately owned laboratory to which a licence has been issued as contemplated in regulation 13;
- “licensing and audit team” means a licensing and audit team referred to in regulation 10(1);
- “maximum wall height” means the vertical distance between the lowest downstream ground elevation on the outside downstream side of the dam wall and the non-overspill crest level or the general top level of the dam wall, excluding the camber;
- “national programme” means the national programme for the testing and monitoring of water quality in Namibia contemplated in section 35(e) of the Act;
- “NQA accredited institution” means an institution, person or organisation accredited by the Namibia Qualifications Authority as contemplated in section 13 of the Namibia Qualifications Authority Act, 1996 (Act No. 29 of 1996);
- “professional engineer” means a person registered as a professional engineer under section 11(2) of the Engineering Profession Act, 1986 (Act No. 18 of 1986);
- “professional team” means two or more persons with expertise in disciplines in which expertise are required, and which disciplines have been determined by the professional engineer concerned with the concurrence of the Minister, and who after submission of particulars of their names, qualifications and professional experience have been approved by the Minister, as contemplated in these regulations;
- “prohibited alien invasive species” means the aquatic plant species declared as such as contemplated in regulation 124(a);

“process controller” means a natural person who is employed by an owner of existing, new or to be established waterworks, and who -

- (a) has the expertise to effectively operate the waterworks; and
- (b) is qualified to design and supervise the construction, installation, operation and maintenance of the waterworks;

“quality assurance” means a set of operating principles that, if strictly followed during sample collection and analysis, will produce data of known and defensible quality in order to ensure that a product or service meets defined standards of quality with a stated level of confidence;

“quality assurance plan” means a formal document describing the detailed quality control procedures by which the quality requirements defined for the data and decisions are to be achieved, and it must clearly define the responsibilities of management, supervisory staff and laboratory staff with respect to the quality systems;

“quality control” means a set of measures within a sample analysis methodology to ensure that the process is in control to measure and control the quality of a product or service so that it meets the needs of users;

“quality management practices” means the practices contemplated in regulations 16 to 36;

“regional maximum flood” means an empirical upper limit estimation of the expected flood peak at a dam site based on the Francou-Rodier approach and calculated according to the 2014 “*Revision of regional flood (RMF) estimation in Namibia*” by GC Cloete, GR Basson and SA Sinske in the South Africa Department of Works, TR 137, on Regional Maximum Flood Peaks in Southern Africa;

“repair of a dam with a safety risk” means the construction work required to repair components of the dam that has been damaged, failed or breached, excluding normal maintenance;

“restricted alien invasive species” means the aquatic plant species declared as such as contemplated in regulation 124(b);

“standard operating procedure” means a document which describes the regularly recurring operations relevant to the quality of the investigation, the purpose of which is to carry out the operations correctly and always in the same manner;

“storage capacity” means the total volume water that could be stored below the -

- (a) lowest unobstructed spillway crest level or free outlet level of a dam; or
- (b) maximum operating level, established by the penstock inlet level or free decant level and as specified in the operation and maintenance manual or code of practice, in the case of any residue deposit including tailings dams;

“the Act” means the Water Resources Management Act, 2013 (Act No. 11 of 2013);

“total freeboard” means the vertical distance between the normal full supply level of the dam and the non-overspill crest of the dam, excluding camber, but including adequately designed parapet walls or wave barriers proud of the crest;

“traceability” means the process whereby the history, location or application of an item or property is verified by means of documented recorded identification;

“waterborne contaminants” means pathogenic micro-organisms that most commonly are transmitted in contaminated fresh water;

“water point” means a point in the distribution of water supplies where the consumer collects for usage or where a sample can be collected for monitoring;

“water quality” means the chemical, physical, biological and radiological characteristics of water;

“water safety plan” means a plan to ensure the safety of drinking water through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer; and

“water sources” means groundwater and surface water.

PART 2

PRICING POLICY FOR SERVICES IN WATER SECTOR

Pricing policy for services in water sector regarding norms and standards for fixing of tariffs of fees and charges for services

2. The norms and standards for the fixing of tariffs of fees and charges for services in the water sector by the Water Regulator as contemplated in section 19(1) of the Act are as follows -

- (a) in order for any tariff structure to succeed, it is essential that the water users accept the pricing policy as fair;
- (b) the tariff structure must avoid unnecessary complexity and must be readily understandable to water users and others who are expected to make decisions based on water prices;
- (c) tariffs must -
 - (i) send out to water users the correct economic signal which will further the aspirations of a water supplier in the directions of demand management and conservation;
 - (ii) be sufficiently high to influence behaviour of water saving in order to reduce wasteful use;
 - (iii) ensure revenue stability for service providers, taking variations in water demand into account;
 - (v) recover the full costs relevant to mining, industrial and commercial enterprises, including irrigation;
- (d) when large increases in tariffs are necessary, the tariffs must be introduced in smaller steps over time, so that the increase may be smoothly integrated into production and consumption decisions by all consumers;
- (e) social equity in the context of water resources implies that all user groups have fair and reasonable access to the scarce water resources of Namibia, while equitable tariffs mean that all customers within the same customer group in a particular water supply area linked to the same pipeline or infrastructure, must pay the same price;

- (f) water services providers -
 - (i) are accountable to the people within their area of supply and -
 - (aa) the cost of providing services must be open to the public for scrutiny if required;
 - (bb) the way in which tariffs are calculated and levied must be transparent and explainable to consumers;
 - (ii) must provide accurate and user-friendly monthly invoices at a specific date each month;
 - (iii) must provide proper customer care and customer queries must be handled in a friendly and professional manner within 30 days after receipt of the query; and
- (g) the security of water supply and water quality must be covered in the water supply agreements between a service provider and its customer.

PART 3

BASIN MANAGEMENT COMMITTEES

Manner of notification of proposed recognition of basin management committee

- 3. The notice contemplated in section 20(4) of the Act must be -
 - (a) published once in the *Gazette* and once in at least two daily newspapers circulating in the area proposed to be defined as the water management area of the basin management committee to be recognised; and
 - (b) displayed, for a period of at least seven days, on the notice board or at any other conspicuous place at the office of -
 - (i) the regional council in whose region the basin management committee to be recognised is situated; and
 - (ii) the local authority council, post office and traditional authority nearest to the place where the water management area of the basin management committee to be recognised is situated; and
 - (c) published and displayed at least seven days prior to the date on which the period referred to in section 20(4)(b) of the Act commences.

PART 4

WATER MANAGEMENT STANDARDS AND LICENSING OF PRIVATELY OWNED LABORATORIES

Water quality standards in respect of water supply for drinking and household purposes

4. Water quality standards in respect of water supply for drinking and household purposes, including maximum levels of contamination for waterborne contaminants, must adhere to the Water Quality Guidelines and Standards for Potable Water set out in Annexure 1 as follows -

- (a) in respect of the chemical and biological requirements as set out in Table 1.1;
- (b) in respect of the standards for microbiological and biological requirements as set out in Table 1.2;
- (c) in respect of the special requirements for the protection of infrastructure as set out in Table 1.3; and
- (d) in respect of the frequency of microbiological monitoring, including turbidity values, for water supply and distribution as set out in Table 1.4.

General criteria for quality of recycled water

5. A person who intends to treat wastewater with the intention of re-using the water must, subject to the purpose of use of the water, adhere to the treatment levels specified in Annexure 2 as follows -

- (a) for purposes of mining and industrial re-use as set out in Table 2.1;
- (b) for purposes of agricultural re-use as set out in Table 2.2;
- (c) for purposes of landscape irrigation as set out in Table 2.3; and
- (d) for purposes of aquaculture as set out in Table 2.4.

Requirements for evaluating and approving processes and designs for treatment of potable water before issuing of licence for water treatment facility

6. (1) The Minister must classify a water treatment facility, which treats potable water for consumption according to the classification set out in Annexure 3.

- (2) The owner or person in control of a water treatment facility must -
 - (a) ensure that the facility complies with the conditions applicable in respect of the licence concerned;
 - (b) ensure that the facility has its own specific operational manual and procedures under which it operates, which manual and procedures must adhere to the Water Quality Guidelines and Standards for Potable Water set out in Annexure 1;
 - (c) ensure that the facility monitors, as a minimum, raw water abstraction, wastewater discharge and final water production figures;
 - (d) ensure, through the necessary quality control, that the final water is produced in accordance with the design and maintained within the relevant design parameters;
 - (e) keep stock of all chemicals acquired, used and remaining on the facility; and
 - (f) keep record of all occurrences of any action or a situation that is separate from the usual course of business of a water treatment facility.

(3) The owner or person in control of a water treatment facility must, upon request in writing by a staff member of the Ministry, make available for inspection by the staff members of the Ministry any information referred to in paragraphs (b), (c), (d), (e) and (f) of subregulation (2).

Requirements for persons engaged in operating water treatment facility

7. (1) The owner or person in control of a water treatment facility must employ the number and class of operators specified in Annexure 4 to operate the water treatment facility.

(2) Subject to regulation 6(1), the owner or person in control of a water treatment facility must have the minimum number of persons, including unskilled persons, on site as set out in Annexure 5.

(3) The owner or person in control of a water treatment facility must keep an updated register of all operators and employees, including their qualifications, who are employed at that facility.

Minimum standards of water supply services to be complied with by water services providers and owners of water treatment facilities

8. The following minimum standards of water supply services must be complied with by water services providers and owners of water treatment facilities, namely -

- (a) in the case of water services providers and owners of water treatment facilities that generate waste water, the sewerage system must consist of public sewers, private sewers and private drains;
- (b) water services providers and owners of water treatment facilities must provide water at a suitable distribution pressure;
- (c) water services providers and owners of water treatment facilities must forthwith fix all leaks; and
- (d) water services providers must provide customers with water supply information that is accurate, transparent, clear, accessible, timely and customer-led.

Requirements for persons engaged for operating waterworks used for supplying water for domestic, commercial, industrial or agricultural use

9. (1) An owner of existing waterworks or new waterworks which are still under construction and will be put into operation must, within 30 days of the commencement of these regulations -

- (a) employ a person as a process controller to be in charge of the waterworks; and
- (b) employ the number and class of operators specified in Annexure 4 to operate the waterworks subject to the classification of the waterworks concerned, the minimum number of employees, including unskilled labourers, on site as set out in Annexure 5.

(2) An owner of waterworks must keep an updated register of all operators and employees, including their qualifications, who are employed at the waterworks.

Licensing and audit team

10. (1) The Executive Director may, with the approval of the Minister and subject to subregulation (3), designate any staff member of the Ministry as a member of a licensing and audit team which must consist of at least one person knowledgeable in each discipline being certified or audited, such as, but not limited to, inorganic and organic chemistry, radiochemistry, microbiology or a related field.

- (2) The licensing and audit team contemplated in subregulation (1) may for purposes of licensing privately owned laboratory -
- (a) audit the privately owned laboratory;
 - (b) review laboratory proficiency test data; and
 - (c) make recommendations to the Minister regarding whether the privately owned laboratory may be licensed or not.
- (3) The members of a licensing and audit team must -
- (a) be experienced professionals that have at least a bachelor's degree or equivalent education or experience in the discipline being certified or audited;
 - (b) have at least twelve months experience in laboratory evaluation and quality assurance;
 - (c) be familiar with data reduction and reporting techniques;
 - (d) be technically conversant with the analytical techniques being evaluated; and
 - (e) be able to communicate effectively, both orally and in writing.
- (4) The Executive Director must ensure that members of a licensing and audit team receive periodic training to ensure that they are knowledgeable on -
- (a) all regulations made under the Act;
 - (b) the best criteria for licensing of privately owned laboratories;
 - (c) laboratory auditing; and
 - (d) water quality testing methods.

Prohibition on testing and ascertaining quality of water supply without being licensed

11. (1) A person may not test and ascertain the quality of water supply for any purpose if the laboratory has not been licensed as contemplated in these regulations.

(2) A person who contravenes or fails to comply with subregulation (1) commits an offence and is on conviction liable to a fine not exceeding N\$50 000 or to imprisonment for a period not exceeding two years or to both such fine and such imprisonment.

Application for licensing of privately owned laboratory to test and ascertain quality of water supply

12. (1) A person who intends to operate a privately owned laboratory to test and ascertain the quality of water for any purpose must make an application, for a licence to do so, to the Executive Director, on a form approved by the Minister which form is obtainable from the offices or official website of the Ministry.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 1 of Annexure 20 or proof of payment of that fee.

Referral of application for licensing of privately owned laboratory to licensing and audit team for consideration

13. (1) On receipt of an application referred to in regulation 12(1), the Minister must refer the application to a licensing and audit team for consideration.

(2) On receipt of the application referred to in regulation 12(1), the licensing and audit team must -

- (a) review the application and, may require additional information from an applicant and after receiving the additional information, assess the application;
- (b) perform an on-site audit to investigate all matters pertaining to the application including whether the applicant under regulation 12(1) complies with the quality management practice technical requirements under regulation 24 and employs the required number of laboratory technicians with the required qualifications and experience; and
- (c) subject to subregulations (3) and (4), make recommendations to the Minister whether the application must be approved or refused.

(3) If an application does not comply with the requirements referred to in subregulation (2)(b) or the licensing and audit team requires additional information or documents, the licensing and audit team must -

- (a) in writing request the applicant to submit the additional information or documents to the licensing and audit team; or
- (b) inform the applicant which steps or measures are necessary to be taken by the applicant in order to comply with the required quality management practice technical requirements.

(4) On -

- (a) receipt of the additional information or documents contemplated in subregulation (3)(a); or
- (b) notification by the applicant that the applicant has complied with the requirements contemplated in subregulation (3)(b),

the licensing and audit team must, pursuant to subregulation (2)(c), make recommendations to the Minister whether the application must be approved or refused.

(5) After receipt of the recommendation contemplated in subregulation (2)(c), the Minister may -

- (a) grant the licence to test and ascertain the quality of water; or
- (b) refuse the application if the application does not comply with any quality management practices.

(6) The Minister must in writing inform an applicant of the decision of the Minister under subregulation (5) and if the application -

- (a) is granted pursuant to paragraph (a) of that subregulation, issue to the applicant a licence to test and ascertain the quality of water contemplated in Annexure 21; and
 - (b) is refused pursuant to paragraph (b) of that subregulation, inform the applicant of the grounds for the refusal.
- (7) A licence issued under subregulation (6)(a) -
- (a) is valid for a period of three years from the date of issue of the licence; and
 - (b) may be renewed by the Minister for a further period of three years, if the licensee applies for the renewal of that licence within 90 days before the expiry date of that licence.

On-site audit

- 14.** (1) The licensing and audit team must -
- (a) annually require a licensed laboratory to analyse a set of proficiency test samples;
 - (b) at least 180 days before the expiry date of the licence contemplated in regulation 13(5), conduct an on-site audit in respect of every licensed laboratory in order to determine whether the laboratory may remain licensed to test and ascertain the quality of water as contemplated in these regulations.
- (2) During an on-site audit contemplated in subregulation (1), the licensing and audit team -
- (a) may request and review all appropriate records such as, but not limited to, qualification certificates of laboratory staff, calibration certificates of instruments and the quality assurance plan for completeness and validity;
 - (b) may require the licensed laboratory to analyse the annual set of proficiency test samples contemplated in subregulation (1)(a) for that year in the presence of the team in order for the team to then evaluate the laboratory's procedures and methods on-site, from sample handling to using the appropriate test method for the given samples;
 - (c) must ensure that the laboratory has a satisfactory quality assurance plan in effect by -
 - (i) determining if the laboratory has written procedures for conducting its quality assurance programme;
 - (ii) examining the quality assurance data to determine if the quality assurance programme is properly implemented; and
 - (d) must complete an on-site audit checklist set out in Annexure 6.
- (3) When completing an on-site audit checklist as contemplated in subregulation (2)(d), the licensing and audit team must -
- (a) list, by item number on the audit checklist, the shortcomings or deviations from standard approved practices observed in the licensed laboratory;

- (b) provide a description of -
 - (i) each shortcoming or deviation contemplated in paragraph (a); and
 - (ii) the recommended corrective action for the shortcoming or deviation referred to in subparagraph (i); and
 - (c) review and discuss with the manager of the licensed laboratory the compliant and non-compliant aspects of the on-site audit.
- (4) If necessary, the licensing and audit team must recommend changes to rectify any short-comings in equipment, supply needs, staffing requirements and general facility improvements, including a time frame to implement corrective actions and response by the laboratory.
- (5) The licensing and audit team may perform a follow-up audit after the time allowed for corrections has elapsed in order to determine whether the laboratory may remain licensed for the next three years to test and ascertain the quality of water as contemplated in these regulations.

Report regarding continued licensing of licensed laboratory

- 15.** (1) After the -
- (a) on-site audit contemplated in regulation 14(1); and
 - (b) follow-up audit contemplated in regulation 14(5), if any,
- has been completed, the licensing and audit team must -
- (i) prepare a report containing all the information pertinent to the audit for submission to the Minister; and
 - (ii) recommend to the Minister whether or not a licence must again be issued to the licensed laboratory for the next three years.
- (2) After receipt of the report and recommendation of the licensing and audit team the Minister must -
- (a) if he or she is satisfied or is of the opinion that a laboratory complies with quality management practices, issue to the laboratory a licence to test and ascertain the quality of water in a form approved by the Minister, subject to the conditions which the Minister may determine on the licence; or
 - (b) after the manager of the licensed laboratory has been afforded an opportunity to be heard, refuse to issue a licence or cancel a licence, if the Minister is satisfied or is of the opinion that the laboratory does not comply with any quality management practice.
- (3) A licence issued in terms of subregulation (2)(a) is, subject to subregulations (4) and (5), valid for a period of three years from the date that licence is issued.
- (4) Despite anything to the contrary contained in these regulations, a licensing and audit team may during the period of validity of a licence perform the following audits -
- (a) a system audit, which is a qualitative walk-through of operations to ensure that all aspects of the quality assurance programme are operational, but during this audit no measurements or analyses are made;

- (b) a performance audit, which is also a walk-through, but includes quantitative checks by the team; or
- (c) a data audit, which is a full check for several selected samples, followed through the overall sampling and analyses process and during this audit all documentation from sample collection to final electronic records is checked in detail and all calculations are checked.

(5) The outcome and results of any audit referred to in subregulation (4) may lead to an on-site audit contemplated in regulation 14(1) to be performed by a licensing and audit team in respect of the licensed laboratory concerned.

Quality assurance plan

16. (1) A licensed laboratory must prepare and adopt a quality assurance plan which must -

- (a) document all resources, policies and procedures forming the quality system;
- (b) clearly define the responsibilities of management, supervisory staff and laboratory staff with respect to the quality system;
- (c) demonstrate that managerial and technical staff have the authority and resources needed to carry out their duties in relation to the quality management system;
- (d) contain policies and procedures to ensure the protection of its customers' confidential information and proprietary rights, including procedures for protecting the electronic storage and transmission of results, and policies to avoid involvement in any activities that would diminish confidence in competence, impartiality, judgement or operational integrity;
- (e) define the organisation and management structure of the laboratory, its place in any parent organisation, and the relationship between quality management, technical operations and support services;
- (f) specify the responsibility, authority and inter-relationships of all staff who manage, perform or verify work affecting the quality of tests;
- (g) contain requirements for adequate supervision of testing staff;
- (h) establish appropriate communication processes to ensure that staff are aware of the relevance and importance of their activities;
- (i) establish and maintain policies and procedures for the review of requests, tenders and contracts relating to the testing and ascertaining of the quality of water, ensuring that -
 - (i) requirements are adequately defined, documented and understood;
 - (ii) the laboratory has the capability, staff and information resources to meet the requirements;
 - (iii) test methods selected for specific parameters are capable of meeting the requirements of customers;

- (iv) the records of reviews and pertinent discussions with customers are maintained; and
 - (v) customers are informed of any deviations from the contract;
 - (j) contain documented policies and procedures in place for the selection and purchasing of services and supplies, including the purchase, reception and correct storage of reagents and laboratory consumables; and
 - (k) contain documented policies and procedures for the resolution of complaints received from customers or other parties, including corrective procedures in the event that any aspects of testing work or results do not conform to test methods or requirements of the customer.
- (2) A licensed laboratory must review and update a quality assurance plan referred to in subregulation (1) at least once a year.

Manager of licensed laboratory

17. A licensed laboratory must appoint -
- (a) a manager who -
 - (i) meets the qualifications and experience specified under regulation 39;
 - (ii) is overall responsible for the technical operations and the provision of resources needed to ensure the required quality of laboratory operations; and
 - (iii) must demonstrate impartiality, independence of judgement and integrity in relation to testing done by the laboratory;
 - (b) a deputy manager who -
 - (i) meets the qualifications and experience required under regulation 39;
 - (ii) is responsible for the functionality of all analysis instruments and the routine procedures; and
 - (iii) must exercise the powers, perform the functions and carry out the duties of the manager if the manager is absent or for any reason unable to perform the functions or carry out the duties set out in subparagraphs (ii) and (iii) of paragraph (a).

Quality manager

18. A licensed laboratory must appoint -
- (a) a quality manager who -
 - (i) has at least a bachelor's degree in chemistry, microbiology, biology or equivalent and at least five years non-academic science related practical work experience;
 - (ii) is responsible for quality management of the laboratory and has direct access to the highest level of management;

- (iii) must update the quality assurance plan when necessary; and
 - (iv) must ensure that the laboratory complies with the requirements stipulated in the quality assurance plan; and
- (b) a deputy quality manager who -
- (i) has at least a bachelor's degree in chemistry, microbiology, biology or equivalent and at least three years non-academic science related practical work experience; and
 - (ii) must exercise the powers, perform the functions and carry out the duties of the quality manager if that manager is absent or for any reason unable to perform the functions or carry out the duties set out in subparagraphs (ii), (iii) and (iv) of paragraph (a).

Document control

19. (1) A licensed laboratory must establish and maintain procedures to control all documents that form part of the quality assurance plan such as, but not limited to, regulations, standards, other normative documents, test methods, drawings, software, specifications, instructions and manuals.

- (2) The control procedures referred to in subregulation (1) must allow for the -
- (a) unique identification of documents;
 - (b) approval of documents by authorised staff prior to issue;
 - (c) periodical review of documents and revision if necessary;
 - (d) marking of obsolete documents and the retaining thereof in storage if necessary; and
 - (e) establishment of a master list identifying revision status and distribution lists of all documents.

Subcontracting of work

20. If a manager of a licensed laboratory elects to subcontract work relating to the testing and ascertaining of the quality of water, the manager must -

- (a) place the subcontracting of work with a competent subcontractor complying with the same or higher standard as the licensed laboratory concerned;
- (b) keep and maintain a register of all subcontractors with proof of compliance contemplated in paragraph (a);
- (c) advise customers prior to sample analysis of all parameters for which the testing and ascertaining of the quality of water will be outsourced to subcontractors; and
- (d) obtain approval in writing by the customer referred to in paragraph (c).

Complaints and corrective action

21. The manager of a licensed laboratory must designate staff with appropriate authority to attend to complaints received from customers or other parties and to implement corrective action if necessary, if non-conforming work or departures from the policies and procedures in the management system or technical operations have been identified.

Internal audits and corrective action

22. (1) The quality manager of a licensed laboratory must conduct or cause to be conducted, with the assistance of the manager of the licensed laboratory, at least once every 180 days, internal audits of activities to verify that operations continue to comply with the requirements of the management system.

(2) The quality manager of a licensed laboratory must take corrective action if audit findings cast doubt on the effectiveness of operations, correctness or the validity of test results.

Review by manager

23. (1) The manager of a licensed laboratory must conduct or cause to be conducted once a year a review of the management system and testing activities of the laboratory.

(2) A review referred to in subregulation (1) must evaluate -

- (a) the suitability of policies and procedures;
- (b) reports from managerial and supervisory staff;
- (c) the outcome of recent internal audits;
- (d) corrective and preventative actions;
- (e) assessment by external bodies;
- (f) the results of inter-laboratory comparisons or proficiency tests;
- (g) changes in the volume and type of work;
- (h) customer feedback;
- (i) complaints;
- (j) recommendations for improvements; and
- (k) other relevant factors, such as quality control activities, resources and staff training.

(3) The manager referred to in subregulation (1) must -

- (a) document the findings of a review referred to therein; and
- (b) update any changes or improvements regarding policies and procedures in the quality assurance plan concerned and other corresponding documents.

Technical requirements

24. (1) In order to comply with licence conditions a licensed laboratory must comply with the various technical requirements contemplated in this regulation and the manager of the licensed laboratory must prove that the laboratory is capable of successfully and consistently producing accurate analysis results.

(2) The manager of a licensed laboratory must consider and take account of all factors influencing correctness and reliability of the test results, including human factors, accommodation and environmental conditions, test methods, equipment, measurement traceability, sampling and handling of test items.

(3) Each licensed laboratory must have generic and specific standard operating procedures designed to prevent deviations resulting from misinterpretation of a process or method.

(4) Each specific standard operating procedure must describe in a step-by-step manner the details of a task or procedure performed on a routine basis, tailored to the equipment, instruments and sample types of the laboratory, which procedure includes -

- (a) the use, operation, calibration and maintenance of relevant equipment, instruments and support equipment;
 - (b) the use of general laboratory supplies;
 - (c) the monitoring of reagent water quality;
 - (d) the preparation of reagents;
 - (e) the preparation of standards;
 - (f) the preparation of culture media;
 - (g) sterilisation practices;
 - (h) incubation practices;
 - (i) dishwashing procedures;
 - (j) the disposal of contaminated material;
 - (k) methods of sampling;
 - (l) methods of sample handling and analysis; and
 - (m) record keeping.
- (5) A standard operating procedure must be -
- (a) written, approved and signed by the manager of the licensed laboratory concerned, indicating the date from which it will be effective;
 - (b) accessible to all relevant staff as hard-copy documents; and

(c) kept updated through routine reviews.

(6) Changes to a standard operating procedure must be documented and signed by the manager of the licensed laboratory, indicating the date from which it will be effective.

(7) The manager of a licensed laboratory must retain outdated standard operating procedures in files for possible future reference.

Laboratory facilities

25. (1) The manager of a licensed laboratory must ensure that the laboratory -

(a) provides a comfortable and safe working environment and complies with all applicable safety regulations made or in force under the Labour Act, 2007 (Act No. 11 of 2007); and

(b) complies with the General Health Regulations promulgated by Government Notice No. 121 of 14 October 1969 under the Public Health Act, 1919 (Act No. 36 of 1919).

(2) The design of a licensed laboratory must allow for adequate storage areas and office space, which must be separate and isolated from the testing areas, but still in close vicinity.

(3) The testing areas of a licensed laboratory must be completely isolated from all other rooms and outside areas and a separate area must be available for the receiving and storing of samples.

(4) A licensed laboratory must have -

(a) sufficient bench-top areas for processing samples, storage space for media, reagents and chemicals, glassware and portable equipment; and

(b) floor space for stationary equipment and designated areas for cleaning glassware and sterilising materials.

(5) A licensee of a licensed laboratory must ensure that the -

(a) bench-tops, floors, walls and ceilings of the laboratory are made of impervious, smooth and easily cleanable materials;

(b) flooring in areas of the laboratory where chemicals are used is chemical resistant; and

(c) walls of the laboratory are non-porous and painted with a durable impervious paint.

(6) Laboratory facilities must be appropriate to attain correct performance of tests and this may include, but is not limited to -

(a) stable and reliable electricity supply;

(b) good ventilation with fume extraction if necessary;

(c) adequate lighting;

(d) safety systems such as fire control measures;

- (e) secure and protected storage for records; and
 - (f) reliable water and gas supplies.
- (6) Cylinders of compressed gas may not be stored in the usage areas within a licensed laboratory but must be located outside that laboratory with pipes leading to the usage areas in that laboratory.

Environmental conditions and access control

26. (1) A water laboratory technician must -
- (a) monitor, control and record critical environmental conditions -
 - (i) as required by the relevant specifications, methods and procedures; or
 - (ii) where it may influence the quality of the results of any test;
 - (b) pay due attention to biological sterility, dust, air quality, humidity, electrical supply, temperature and vibration levels, as appropriate to the technical activities concerned;
 - (c) take care to ensure that incompatible activities are clearly separated by a combination of management practices and through time and space allocations;
 - (d) define and control access to and use of areas affecting quality of the tests; and
 - (e) monitor and control the use of chemicals and pest control measures.
- (2) The manager of a licensed laboratory must -
- (a) secure the laboratory to provide for client confidentiality and ensure that data and samples can only be accessed by staff members who are authorised access by the manager; and
 - (b) take measures to ensure good housekeeping in the laboratory.

Microbiological laboratories

27. As the likelihood of contamination of samples in laboratories that test microbiological samples is much higher than for samples that are only tested for physical and chemical parameters, the following additional precautions must be taken by the quality manager of a licensed laboratory, namely -

- (a) the traffic flow must be minimised to ensure that contamination does not adversely affect data quality;
- (b) the air quality must be monitored by using air sampling devices or air settling plates;
- (c) critical work surfaces must be monitored by surface swabs; and
- (d) provision must be made for decontamination and disposal of microbiological waste.

Instrumentation and analytical support equipment

28. The manager of a licensed laboratory must ensure that -
- (a) the laboratory has appropriate and sufficient instruments and support equipment such as fume hoods, refrigerators, freezers, ovens, balances and water purification systems required for the correct performance of all tests;
 - (b) equipment and software used for testing are capable of achieving the accuracy required and comply with specifications relevant to the tests concerned;
 - (c) the laboratory provides an environment which protects the equipment from corrosion, excessive dust, vibration and other factors which could lead to its failure, loss of calibration or deterioration;
 - (d) laboratory instruments and equipment are operated only by staff members who are authorised to do so by the manager and that all instruments are maintained by staff members of the laboratory who received training to do so or by staff members of the manufacturer of the instruments or collectively by the staff members of both the laboratory and manufacturer;
 - (e) instrumentation manuals provided by the manufacturer are available to provide instruction in the proper use of instrumentation;
 - (f) operational viability of all equipment is ensured through preventative maintenance and servicing;
 - (g) the plans for routine maintenance of equipment are based on the recommendations of the equipment suppliers and on the experience staff members of the laboratory had with similar equipment;
 - (h) equipment that has either been subjected to overloading or mishandling or gives suspect results or has been shown to be defective or outside specified limits, is taken out of service, clearly marked and appropriately stored until it has been repaired and shown by a calibration or test to perform correctly;
 - (i) the laboratory maintains traceability to the international system through calibration of measuring equipment;
 - (j) intermediate checks are carried out on the performance of critical equipment and documented to provide evidence of continuous traceability;
 - (k) calibration intervals are predetermined in order to ensure that re-calibration takes place before the previous calibration has deteriorated to the point where the validity of the measurements is questionable;
 - (l) if it is not possible to carry out simple routine verification to confirm that calibration is maintained, the laboratory relies on setting calibration intervals;
 - (m) the laboratory sets an initial calibration interval based on -
 - (i) the recommendations of the manufacturer;
 - (ii) the heaviness of use of the instrument;

- (iii) the accuracy required;
 - (iv) the perceived risk of a loss of calibration; and
 - (v) the using experience of similar instruments;
- (n) the calibration is checked at the end of the interval referred to in paragraph (m) and if it is still correct the interval is confirmed as adequate;
- (o) alternatively, the interval is reduced by 50% if the check shows that re-calibration is required, but this process must be continued until an appropriate and adequate interval is obtained and records must be kept so that, if necessary, the laboratory can justify the interval chosen;
- (p) inventory, calibration and maintenance records are maintained for each item of equipment significant to the tests performed; and
- (q) the laboratory provides an identification number for each item of equipment and maintain a file under this identification number, which file must provide information about the equipment such as -
- (i) when it was received;
 - (ii) its continuous calibration status;
 - (iii) any problems observed;
 - (iv) any repairs carried out; and
 - (v) the instructions followed to operate and maintain it.

Instrumentation and equipment for chemical laboratories

29. The manager of a licensed laboratory testing potable water and wastewater for basic physical properties and concentrations of chemical and biological components must ensure that -

- (a) the laboratory makes use of manual or automated classical wet chemical techniques or their ion chromatography and capillary ion electrophoresis automated variations or both the classical wet chemical techniques and their automated variations;
- (b) the following general list of equipment needed to determine individual anions by conventional colourimetric, electrometric or titrimetric methods are available and used in the laboratory, namely -
 - (i) temperature monitoring devices, glass, dial or electronic thermometers which must be graduated in 0.1 °C increments or less;
 - (ii) pH meter, working range 1-14 with electrode and preferably temperature compensation, accuracy and scale graduations are within 0.05 units or less;
 - (iii) pH/ millivolt meter with a scale readable to +/- 1400 mV with combined oxidation-reduction electrode or half cells;
 - (iv) conductivity meter with either platinum or non-platinum electrode type, cell choice depends on expected range of conductivity;

- (v) dissolved oxygen meter with oxygen sensitive membrane electrode;
- (vi) colourimetric equipment such as -
 - (aa) spectrophotometer having absorption cells of a minimum of 10 mm, a narrow 10 nm or less spectral band and an effective operating range from 400 to 700 nm; or
 - (bb) filter photometer with filters having a minimum light path of 1 cm;
- (vii) turbidimeter with sample cells or tubes of clear colourless glass or plastic, the sensitivity of the instrument permits detecting turbidity differences of 0.02 NTU or less in the lowest range in waters having a turbidity of less than 1 NTU;
- (viii) electrometric titrator with appropriate electrodes;
- (ix) pH millivolt meter with an expandable scale and 0.1 mV readability or a direct-reading selective ion meter with appropriate ion selective electrodes;
- (x) analytical balance, capable of weighing to 0.0001 g;
- (xi) filtration apparatus;
- (xii) drying oven or sand bath, for operation at 180 °C;
- (xiii) desiccator;
- (xiv) magnetic or mechanical stirrer with stirring bar or impeller respectively;
- (xv) hotplate;
- (xvi) digestion and distillation apparatus or block digester capable of maintaining a temperature of 380 °C for 2h;
- (xvii) distillation apparatus;
- (xviii) stopwatch or electrical timer;
- (xix) BOD incubation bottles;
- (xx) air incubator or water bath, thermostatically controlled at 20 +/- 1 °C;
- (xxi) blender;
- (xxii) refrigerator;
- (xxiii) reflux apparatus or block heater to operate at 150 °C;
- (xxiv) general glass- and plastic ware;
- (xxv) volumetric glassware; and
- (xxvi) pipettors.

- (c) metals are determined satisfactorily by a variety of methods, with the choice often depending on the precision and sensitivity required, through available instrumental methods such as atomic absorption spectrometry, including flame, electrothermal, hydride and cold vapour techniques, flame photometry, inductively coupled plasma spectrometry and anodic stripping voltammetry.

Microbiological laboratories

30. The manager of a licensed microbiological laboratory must ensure that the following general list of equipment needed to operate a microbiological laboratory successfully are available and used in the laboratory, namely -

- (a) pH meter, working range 1-14 with electrode and preferably temperature compensation, accuracy and scale graduations shall be within 0.1 units or less;
- (b) electronic balance, top loader, readability 0.1 g;
- (c) electronic balance, semi-micro analytical, readability 0.001 g;
- (d) temperature monitoring devices, glass, dial or electronic thermometers (thermometers must be graduated in 0.5 °C increments, 0.2 °C increments for tests which are incubated at 44.5 °C or less);
- (e) incubator;
- (f) water bath with lid;
- (g) autoclave or steam steriliser;
- (h) sterilising oven, temperature up to 250 °C, if used;
- (i) optical counting equipment;
- (j) refrigerator and freezer;
- (k) media preparation utensils;
- (l) inoculating equipment;
- (m) burner;
- (n) membrane filtration equipment, if used;
- (o) culture dishes;
- (p) pipettes and graduated cylinders;
- (q) media and solution dispensers;
- (r) fermentation tubes and vials, if used;
- (s) glassware and plastic ware;
- (t) ultraviolet lamp, if used;

- (u) vortex mixer, if used;
- (v) water purification system producing laboratory-grade de-ionised water;
- (w) conductivity meter with electrode;
- (x) microscope if used; and
- (y) laminar flow hood or biological safety cabinet.

Asset management

- 31.** The manager of a licensed laboratory must ensure that -
- (a) in addition to the regular checks and procedures to be followed, stock is kept of essential spares and consumables in or at the laboratory;
 - (b) in the event of failure of equipment that is crucial to the successful operation of the laboratory, laboratory staff are able to replace or repair the equipment with minimal or no laboratory down-time;
 - (c) stock levels of consumables and chemicals are managed carefully in order to ensure that sufficient time is allowed for re-ordering and delivering new supplies; and
 - (d) an equipment asset management list is kept and maintained in order to identify -
 - (i) what assets the laboratory owns;
 - (ii) where the assets contemplated in paragraph (a) are located or stored; and
 - (iii) what the condition and service history of the assets contemplated in paragraph (a) is,

and the data is catalogued in a logical, readable format of a handwritten list, spreadsheet software, database software or even commercially available asset management database software for very large laboratories.

Collection of samples

32. (1) Where water quality analyses cannot be performed on site, a representative sample of water at a specific point of interest must be taken by an expert in the water treatment field and must be analysed in an approved and licensed laboratory for water analysis purposes.

(2) A laboratory may offer sample collection services to clients but the offering of sample collection services is not a requirement to be a licensed laboratory.

(3) A laboratory staff member who collects samples must exercise utmost care in the collection of the samples and must take the following into account -

- (a) when samples are collected from a river or stream, observed results may vary with depth, stream flow and distance from each shore, and if equipment is available an integrated sample from top to bottom in the middle of the main channel of the river or stream from side to side at mid-depth must be taken;

- (b) rivers, streams, lakes and dams are subjected to considerable variations from normal causes inclusive of seasonal stratification, diurnal variations, rainfall, runoff and wind and the location, depth and frequency of sampling depend on local conditions and the purpose of the investigation;
 - (c) although well pumping protocols depend on the objectives of an investigation and other factors such as well characteristics and available equipment, a general rule is to collect samples from wells only after the well has been purged sufficiently to ensure that the sample represents the groundwater;
 - (d) important factors affecting test results are -
 - (i) the presence of suspended matter or turbidity;
 - (ii) the method chosen for removing a sample from its container; and
 - (iii) the physical and chemical changes brought about by storage or aeration or both;
 - (e) detailed procedures are essential when processing samples to be analysed for trace constituents, especially metals and organic compounds and the technique for collecting a representative sample and defining it in the sampling plan must be carefully considered;
 - (f) the type of sample container used is of utmost importance and sample containers must be tested to be free of analytes of interest and it must be so documented, especially when sampling and analysing for very low analyte levels are done;
 - (g) some sample analytes may be absorbed into the wall of plastic containers and similarly contaminants from plastic containers may leach into samples;
 - (h) some analytes are light-sensitive and must be collected in amber-coloured glass containers to minimise photo degradation;
 - (i) in order to minimise the potential for volatilisation or biodegradation between sampling and analysis, samples must be kept as cool as possible without freezing, and although no single method of preservation is entirely satisfactory -
 - (i) preservation must be chosen with due regard to the determination to be made; and
 - (ii) chemical preservatives must only be used when they do not interfere with the analysis being made;
 - (j) methods of preservation are relatively limited and are intended generally to retard biological action, retard hydrolysis of chemical compounds and complexes and reduce volatility of constituents.
- (4) A laboratory staff member who collects samples for analysis of major inorganic and physiochemical parameters must -
- (a) use bottles of approximately one litre capacity with close-fitting clean stoppers and avoid the use of metal-lined caps;

- (b) if clean bottles are not supplied by the laboratory, clean the bottles thoroughly before use;
 - (c) collect water samples that represents in time and space that part of the aqueous system to be tested;
 - (d) fix sampling points by detailed description in the sampling plan by maps or with the aid of landmarks in a manner that will permit their identification by other persons;
 - (e) pump the water from a new borehole or well for at least 24 hours before taking a sample, as borehole drilling, borehole completion and borehole development methods can have long term effects on sample chemistry;
 - (f) before collecting samples from distribution systems, flush lines with the tap fully open for two to three minutes before taking a sample;
 - (g) rinse the bottle with the water being sampled before starting to collect the sample, unless the bottle contains a preservative;
 - (h) fill the container full;
 - (i) make a record of every sample collected and identify every bottle;
 - (j) submit samples in clearly labelled bottles and include on the label when and where the sample was taken; and
 - (k) deliver samples to the laboratory as soon as practicable after collection, if possible within two days, but if shorter holding times are required, which must be confirmed with the laboratory concerned before the collection of samples, make special arrangements to insure timely delivery to the laboratory.
- (5) A laboratory staff member who collects samples for microbiological tests must -
- (a) use only laboratory supplied sterile bottles of which the volume is sufficient to carry out all tests required, preferably not less than 100 ml;
 - (b) wash hands carefully with soap and water before collecting the sample;
 - (c) collect the sample from a drinking water outlet, not a hydrant, hose or faucet located outside a building, by removing the aeration screen from the tap and disinfecting the end of the faucet with a bleach solution mixed in the ratio of one part bleach to four parts water;
 - (d) allow the water to run for two minutes before adjusting the flow to a stream about the width of a pencil and -
 - (i) take the cap off the bottle and hold the cap in one hand and the bottle in the other, but never rinse the bottle as it contains a neutralising agent to neutralise any chlorine;
 - (ii) carefully fill the bottle within 6mm to 7mm of the top and replace the cap to the bottle without touching the inside of the cap or the mouth of the bottle;

- (e) complete all areas of the sample request form;
- (f) clearly print the sample description, date and time on every sample bottle;
- (g) place the sample bottle with the correct requisition form in an insulated cooler which must contain absorbent material in the event a sample bottle leaks or is broken in transit and place enough ice packs in the cooler so the sample will stay cool but will not freeze during transportation to the laboratory;
- (h) keep in mind that -
 - (i) samples older than 24 hours but younger than 48 hours will be tested only for the presence or absence of indicator bacteria and samples older than 48 hours will not be tested;
 - (ii) in the case of any examination commenced more than -
 - (aa) six hours after sampling if not cooled;
 - (bb) 24 hours after sampling for cooled samples,

the results obtained may not be used to assess compliance or non-compliance with the requirements of the specification, but the results may be used only for purposes of information;
 - (iii) if a sample needs to be tested for both chemical and microbiological tests, two samples must be collected;
 - (iv) if the source carries a high organics content or if contamination from human or animal activity is suspected or the source carries a high organics content and contamination from human or animal activity is suspected, microbial indicators must be tested for.
- (6) A person collecting samples must -
 - (a) thoroughly plan and prepare for sampling trips to ensure that there will be no need to have to replenish supplies, especially for sample points which may be far away from the office or laboratory;
 - (b) be familiar with the holding time of samples prior to analysis and must consult the laboratory concerned if he or she is not sure;
 - (c) keep in mind that the collecting of sampling requires more than just a sample bottle and if field instruments are used to determine parameters such as pH, conductivity and turbidity on site, these need to be properly calibrated before departing on the sampling trip.
- (7) A person who collects water samples for testing water quality must determine whether he or she has all the equipment needed for the sampling trip by using the Minimum Water Quality Sampling Equipment Checklist set out in Annexure 7.

Handling of samples

33. (1) Samples must be handled and transported according to the requirements described in the test methods of all parameters to be tested, and for each required parameter a sample concerned must be tested before expiration of the maximum holding time for that parameter as set out in Annexure 8.

(2) The manager of a licensed laboratory must ensure that the laboratory has a system to identify test items throughout the life of the item in the laboratory.

(3) A laboratory technician must record any abnormalities of items or departures from normal or specified conditions, as described in the test method upon receipt of the test item.

(4) The manager of a licensed laboratory must ensure that a customer concerned is consulted for further instructions before proceeding and that the discussion is recorded if -

- (a) there is doubt as to the suitability of an item for testing;
- (b) the item does not conform to the description provided; or
- (c) the test required is not specified in sufficient detail.

Preservation of samples

34. The manager of a licensed laboratory must ensure that -

- (a) the laboratory has procedures and appropriate facilities for avoiding deterioration, loss or damage to a test item during storage, handling and preparation thereof; and
- (b) that correct holding times and temperatures during sample storage, handling of test items, appropriate preparatory processes such as digestions or extractions, dilutions or concentrations are ensured in accordance with the test methods concerned.

Test items

35. The manager of a licensed laboratory must ensure that -

- (a) the laboratory has a system in place to identify test items throughout the life of the item in the laboratory;
- (b) any abnormalities of items or departures from normal or specified conditions, as described in the test method upon receipt of the test item, must be recorded;
- (c) the laboratory consults the customer concerned for further instructions before proceeding and record the discussion if -
 - (i) there is doubt as to the suitability of an item for testing;
 - (ii) the item does not conform to the description provided; or
 - (iii) the test required is not specified in sufficient detail;
- (d) the laboratory has procedures and appropriate facilities in place for avoiding deterioration, loss or damage to the test item during storage, handling and preparation; and

- (e) correct holding times and temperatures during sample storage, handling of test items, appropriate preparatory processes such as digestions or extractions, dilutions or concentrations are ensured in accordance with the test methods concerned.

Use of approved analytical methods

36. (1) For the purposes of this regulation “validation”, “validating” and “validated” involves a series of technical activities carried out with careful planning to identify the suitability of a test method for examining and identified matrix.

- (2) The manager of a licensed laboratory must ensure that -
 - (a) in selecting methods for testing an item, the laboratory technician concerned considers the requirements of the clients, the requirements of the regulatory organisations and the suitability of the test method for the purpose;
 - (b) well validated test methods are selected, written by organisations engaged in writing test methods such as -
 - (i) the International Standards Organisation (ISO);
 - (ii) the American Public Health Organisation (APHA) in conjunction with the American Water Works Association (AWWA);
 - (iii) the US Environmental Protection Agency (EPA); or
 - (iv) the South African National Standards (SANS).

(3) The manager of a licensed laboratory that uses methods, in-house methods and methods associated with equipment described by other organisations than those mentioned in subregulation (2)(b) must generate full validation information and provide objective evidence that the particular requirements for a specific intended use are fulfilled.

(4) The manager of a licensed laboratory must ensure that the following is addressed in validating a test method -

- (a) selectivity and specificity;
- (b) range of matrices to which the method is applicable;
- (c) linearity;
- (d) sensitivity and range;
- (e) accuracy and precision;
- (f) limit of detection;
- (g) limit of quantification;
- (h) ruggedness and robustness; and
- (i) bias.

(5) A method written by an organisation mentioned in subregulation (2)(b) or any other internationally accepted method must also be validated if changes were made to the procedure or to the matrix, but an analyst using a validated method must still provide evidence of his or her competence gained through -

- (a) regular and extensive practice, including performance checks; and
- (b) engaging in proficiency testing.

Minimum testing capability

37. The manager of a licensed laboratory must -

- (a) subject to paragraph (b), ensure that the laboratory has the facilities to test for the required standard specifications and parameters set out in Annexure 1 for both drinking water and wastewater; and
- (b) if the laboratory is not able to test for all the specifications or parameters contemplated in paragraph (a), indicate which specifications or parameters it is unable to test for,

but as a minimum each privately owned laboratory must be able to test for the chemical and physical parameters listed in Annexure 9.

Quality control for validity of test results

38. In order to ensure the validity and trustworthiness of test results, the manager of a licensed laboratory must ensure that -

- (a) the laboratory adheres to the quality control procedures set out in paragraphs (b) to (e) by -
 - (i) using regularly certified reference materials or secondary reference materials;
 - (ii) participating in inter-laboratory comparisons or proficiency programmes;
 - (iii) performing replicate tests using the same or different methods;
 - (iv) retesting retained stable samples;
 - (v) correlating results for different characteristics of samples;
 - (vi) recording data in such a way that trends are detectable;
 - (vii) applying statistical techniques to the reviewing of the results where practicable;
 - (viii) checking the correctness of analyses where it applies specifically to water samples with relative complete analyses;
- (b) appropriate quality control techniques applied to each batch of samples is recorded and documented;

- (c) quality control data is made available to the client and that batch quality control results are included in the test reports;
- (d) the type and number of quality control samples such as -
 - (i) reagent and method blanks to monitor possible contamination;
 - (ii) duplicates to monitor precision;
 - (iii) certified reference samples to monitor accuracy;
 - (iv) internal reference samples to monitor accuracy; and
 - (v) analysis spikes or matrix spikes to monitor recoveries,to be analysed, are stated in the test method in the quality control manual of the laboratory;
- (e) the laboratory establishes quality control acceptance criteria, with control charts for quality control samples;
- (f) control limits, which may be set using values from external sources including standard methods and of which commonly used limits are $\pm 2s$ for warning limits and $\pm 3s$ for control limits, are statistically based on data generated from quality control samples in each laboratory;
- (g) corrective action is taken when quality control data is outside the acceptance limits or exhibits a trend; and
- (h) records of out-of-control events and actions are maintained.

Manager of licensed laboratory

- 39.** The manager and deputy manager of a licensed laboratory -
- (a) must hold at least a bachelor's degree in chemistry, microbiology, biology or any other relevant scientific field;
 - (b) must have at least a minimum of seven years non-academic laboratory experience in microbiological and chemical testing;
 - (c) must have managerial capability appropriate to the size and type of laboratory;
 - (d) must be familiar with the test and calibration procedures of tests offered and be aware of the limitations of these procedures;
 - (e) is ultimately responsible for ensuring that -
 - (i) all laboratory staff has demonstrated proficiency for their assigned functions; and
 - (ii) all data reported by the laboratory meet the required quality assurance criteria and regulatory requirements.

Laboratory analyst

40. (1) A laboratory analyst in a licensed laboratory for physicochemical and microbiological analyses must hold at least a bachelor's degree in a relevant scientific field or have at least four years' experience in chemical and microbiological testing.

(2) The records of qualifications and experience of a laboratory analyst to be kept by a licensed laboratory must include -

- (i) a copy of current resume;
- (ii) records of training in new laboratory operations;
- (iii) records of attendance at technical meetings and seminars; and
- (iv) records of completion of relevant courses including any in-house, part-time and full-time courses.

(3) Initial proficiency in the performance of an analysis new to the analyst must be demonstrated by the successful analysis of known samples, standards or certified material prior to the analyst being assigned routine analysis and continuing proficiency may be monitored through the analysis of routine quality control samples, certified materials, performance evaluation samples and by participation in inter-laboratory studies.

Laboratory technician

41. (1) A laboratory technician in a licensed laboratory must hold at least a national diploma, in a relevant scientific field, received from an NQA accredited institution or have two or more years work experience in a microbiological or chemical testing laboratory.

(2) The records of qualifications and experience of a laboratory technician to be kept by a licensed laboratory must include -

- (i) a copy of current resume;
- (ii) records of training in new laboratory operations;
- (iii) records of attendance at technical meetings and seminars; and
- (iv) records of completion of relevant courses including any in-house, part-time and full-time courses.

Administrative and support staff

42. The manager of a licensed laboratory may employ the necessary administrative and support staff such as accounting and resource management staff with suitable qualifications or experience or both as required for the specific position but, as a minimum requirement, a support staff member must have at least a Grade 12 certificate with an aptitude and liking for laboratory work and knowledge of the working language of a laboratory.

PART 5

WATER SERVICES, ABSTRACTION AND USE LICENCES

Application for licence as water services provider

43. (1) A person who intends to apply for a licence under section 41(2) of the Act must apply to the Executive Director on a form approved by the Minister which form is obtainable from the offices or official website of the Ministry.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 2 of Annexure 20 or proof of payment of that fee.

Application for licence to abstract and use water

44. (1) A person who intends to apply for a licence under section 44(2) of the Act must apply to the Executive Director on a form approved by the Minister which form is obtainable from the offices or official website of the Ministry.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 3 of Annexure 20 or proof of payment of that fee.

Renewal of licence to abstract and use water

45. (1) The holder of a licence to abstract and use water who intends to renew the licence may apply in the manner and form contemplated in regulation 44(1) and within 90 days before the expiry of that licence, for the renewal of that licence.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 4 of Annexure 20 or proof of payment of that fee.

Application for borehole licence

46. (1) A person who intends to apply for a licence under section 56(3) of the Act must apply to the Executive Director on a form approved by the Minister which form is obtainable from the offices or official website of the Ministry.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 5 of Annexure 20 or proof of payment of that fee.

Application for groundwater disposal licence

47. (1) A person who intends to apply for a licence under section 64(2) of the Act must apply to the Executive Director on a form approved by the Minister which form is obtainable from the offices or official website of the Ministry.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 6 of Annexure 20 or proof of payment of that fee.

PART 6

PROCEDURES AND CONDITIONS FOR ARTIFICIAL
RECHARGE OF AQUIFERS**Authorisation for exploration and drilling in order to establish boreholes for artificial recharge of aquifers**

48. Only the holder of a borehole licence may do exploration and drilling work in order to establish boreholes for any artificial recharge of aquifers.

Authorisation to store ground water in artificial recharge scheme and application for licence to store ground water in artificial recharge scheme

49. (1) A person may only store ground water in an artificial recharge scheme if the person holds a licence, contemplated in section 44(1) of the Act, issued by the Minister, that authorises the storing concerned.

- (2) An application for a licence referred to in subregulation (1) must -
 - (a) be made in the manner or form contemplated in regulation 44;
 - (b) contain or be accompanied by any information required by the Minister; and
 - (c) be accompanied by the application fee set out in item 7 of Annexure 20 or proof of payment of that fee.
- (3) The Minister may by written notice given to the applicant require the applicant -
 - (a) to provide any further information specified in the notice within the period specified in the notice; or
 - (b) to participate in an investigation specified in the notice designed to enable the Minister to assess the likely effects of granting the application and to bear the full costs of the investigation or such part of those costs as specified by the Minister in the notice.
- (4) The Minister must consider an application referred to in subregulation (2) and may -
 - (a) grant the application and issue a licence contemplated in Annexure 22 if -
 - (i) the applicant has illustrated its technical and financial capability to construct and operate the artificial recharge scheme through the pre-feasibility and feasibility phases contemplated in regulation 51;
 - (ii) storage at the scheme will not cause unreasonable damage to land or other water users within the maximum area of impact of the maximum amount of water that could be in storage at any one time at the underground storage facility over the duration of the licence;
 - (iii) the scheme is not in a location that will promote either the migration of contaminant plumes or the migration of poor quality groundwater or is not in a location that will result in pollutants being leached to the groundwater table so as to cause damage;

- (iv) the applicant has a right to use the proposed source of water;
 - (v) the water storage will occur at a facility designated as a water storage facility by the owner of the scheme; and
 - (vi) the applicant has consulted all relevant stakeholders; or
- (b) refuse to grant the application and decline to issue the licence if -
- (i) the applicant has not illustrated its technical and financial capability to construct and operate the artificial recharge scheme through the pre-feasibility and feasibility phases contemplated in regulation 51;
 - (ii) storage at the scheme will cause unreasonable damage to land or other water users within the maximum area of impact of the maximum amount of water that could be in storage at any one time at the underground storage facility over the duration of the licence;
 - (iii) the scheme is in a location that will promote either the migration of contaminant plumes or the migration of poor quality groundwater or is in a location that will result in pollutants being leached to the groundwater table so as to cause damage;
 - (iv) the applicant does not have a right to use the proposed source of water;
 - (v) the water storage will not occur at a permitted storage or underground storage facility; or
 - (vi) the applicant has not consulted all relevant stakeholders.

Authorisation for abstraction of groundwater from artificial recharge scheme

50. Only the holder of a licence to abstract and use water may abstract groundwater from any artificial recharge scheme.

Pre-feasibility phase and pre-feasibility study

- 51.** (1) An applicant contemplated in regulation 50 must undertake a pre-feasibility study which -
- (a) requires the applicant to formulate a proposal;
 - (b) provides justification for the scheme and an initial assessment of the viability of the scheme; and
 - (c) identifies the authorisation requirements, both in terms of groundwater exploration and licensing use, as well as environmental requirements.
- (2) The pre-feasibility study report, of the pre-feasibility study contemplated in subregulation (1) must include and describe the -
- (a) viability of the scheme in relation to -
 - (i) a well-defined need for an artificial recharge scheme, including a comparison with alternative water supply options;

- (ii) the source water;
 - (iii) aquifer hydraulics;
 - (iv) water quality, including clogging;
 - (v) the artificial recharge method and engineering issues;
 - (vi) environmental issues;
 - (vii) stakeholder consultation or requirements;
 - (viii) legal and regulatory issues;
 - (ix) economics;
 - (x) management and technical capacity; and
 - (xi) institutional arrangements;
- (b) proposed tests or investigations to assess the feasibility of the scheme;
 - (c) list of activities during the testing phase that may require groundwater exploration and licensing use, as well as environmental authorisation;
 - (d) quantification of the volume of water to be recharged;
 - (e) source and quality of the recharge water;
 - (f) proposed recharge method;
 - (g) ability of the aquifer to accept and store the water;
 - (h) ability to recover the water;
 - (i) potential environmental impacts and their mitigation measures;
 - (j) conceptual design of the scheme;
 - (k) existing permits, licenses or water rights;
 - (l) existing hydrological and geo-hydrological data;
 - (m) feasibility study plan and detailed cost estimate for monitoring, operation and maintenance; and
 - (n) preliminary scheme implementation plan.

Feasibility study

52. (1) A person who intends to operate an artificial recharge scheme must ensure that a feasibility study for the operation of the artificial recharge scheme is undertaken to ensure that the artificial recharge scheme to be implemented is feasible, affordable and sustainable.

- (2) A feasibility study contemplated in subregulation (1) -
 - (a) is subject to the Environmental Impact Assessment Regulations; and
 - (b) must involve the testing of the artificial recharge scheme, either at pilot or full scale level, taking into account any condition set in the permits or licences.
- (3) The feasibility study report on the study contemplated in subregulation (1) must address, subject to any determinations made by the Environmental Commissioner under regulation 14 of the Environmental Impact Assessment Regulations -
 - (a) the need for the artificial recharge scheme;
 - (b) the quantity, quality and reliability of the source water;
 - (c) aquifer hydraulics;
 - (d) ambient groundwater quality;
 - (e) artificial recharge methods and engineering issues;
 - (f) environmental issues;
 - (g) the water safety plan;
 - (h) risk assessment;
 - (i) legal and regulatory issues;
 - (j) economic issues;
 - (k) stakeholder consultation and requirements;
 - (l) management and technical capacity;
 - (m) institutional arrangements;
 - (n) preliminary infrastructure design;
 - (o) the detailed scheme implementation plan; and
 - (p) a funding plan, identifying funding sources and requirements.

Approval to proceed with operation of artificial recharge scheme

53. (1) A person who intends to operate an artificial recharge scheme must make an application for an approval to do so to the Executive Director on a form approved by the Minister which form is obtainable from the offices or official website of the Ministry.

- (2) An application for approval referred to in subregulation (1) must be accompanied by -
 - (a) the feasibility report contemplated in regulation 52;
 - (b) the standard monitoring plan;

- (c) the water safety plan;
 - (d) the operational and maintenance procedures developed during the implementation phase;
 - (e) the decommissioning plan; and
 - (f) any information required by the Minister.
- (3) The Minister may by written notice given to the applicant require the applicant to -
- (a) provide any further information specified in the notice within the period specified in the notice; or
 - (b) participate in an investigation specified in the notice designed to enable the Minister to assess the likely effects of granting the application and to bear the full costs of the investigation, or such part of those costs as specified by the Minister in the notice.
- (4) The Minister must consider an application referred to in subregulation (2) and may -
- (a) grant the approval if in his or her opinion the artificial recharge scheme should be operated; or
 - (b) refuse the approval if in his or her opinion the artificial recharge scheme should not be operated.
- (5) If the Minister -
- (a) grants approval as contemplated in subregulation (4)(a) the Minister must, in writing, inform the applicant; or
 - (b) refuses to grant approval as contemplated in subregulation (4)(b) the Minister must, in writing, inform the applicant and provide reasons for the refusal of the approval.
- (6) An approval referred to in subregulation (4)(a) is valid for a period of five years.

Implementation of artificial recharge scheme

54. If the Minister grants approval as contemplated in regulation 53(4)(a), the implementation of the artificial recharge scheme may commence and the implementation phase includes the following activities -

- (a) the development of any infrastructure identified during the feasibility study, which may include further drilling and testing;
- (b) the establishing of a monitoring network for monitoring recharge and abstraction volumes, water levels across the aquifer and water quality according to the risk assessment and water safety plan;
- (c) the designing of detailed infrastructure based on the preliminary design done during the feasibility phase;
- (d) the construction of the artificial recharge scheme;
- (e) the ensuring of adherence to the environmental plan and other licence conditions;

- (f) the establishing of standard monitoring, operational and maintenance procedures;
- (g) the ensuring that sufficient institutional capacity is in place to operate and maintain the artificial recharge scheme; and
- (h) the establishing of a decommissioning plan for any or all components of the artificial recharge scheme.

Operation and maintenance

- 55.** The holder of an approval referred to in regulation 53(4)(a) must -
- (a) adhere to approved licence conditions;
 - (b) operate the artificial recharge scheme so as to effectively and efficiently recharge groundwater resources;
 - (c) continuously monitor the performance of the artificial recharge scheme and the response of the aquifer during recharge and abstraction cycles;
 - (d) optimise the performance of the artificial recharge scheme;
 - (e) continuously improve the artificial recharge scheme as more data becomes available; and
 - (f) adjust the operations of the artificial recharge scheme if and when necessary.

Renewal of approval to operate artificial recharge scheme

56. (1) The holder of an approval referred to in regulation 53(4)(a) who intends to renew that approval must apply to the Minister, in the manner and form contemplated in that regulation and within 90 days before the expiry of the approval, for the renewal of the approval.

(2) Regulations 53, 54 and 55 apply with the necessary changes to an application for the renewal of an approval referred to in regulation 53(4)(a).

(3) The application contemplated in subregulation (1) must be accompanied by particulars of -

- (a) the viability of the scheme as defined in the pre-feasibility study;
 - (b) any changes in source water and groundwater water quality over time;
 - (c) the efficiency of the recharge method;
 - (d) the ability of the aquifer to accept and store recharged volumes;
 - (e) the ability to recover the recharged water; and
 - (f) any environmental changes, either positive or negative.
- (4) In considering an application referred to in subregulation (1) the Minister must -
- (a) have regard to the requirements under regulation 53(2), as well as whether or to what extent the applicant has complied with any existing licence conditions; and

- (b) renew the approval unless, in the opinion of the Minister there are good reasons not to do so.

Risk assessment

57. (1) The operator of a drinking water scheme which is using an aquifer as a natural storage buffer must do a risk analysis and prepare a water safety plan for the particular scheme.

(2) The level of detail required for a risk assessment depends on factors such as -

- (a) the scale of the water recharge scheme;
- (b) the source of the water;
- (c) the method of treatment;
- (d) the sensitivity of the receiving aquifer;
- (e) the sensitivity of the receiving environment, especially regarding water logging;
- (f) the aquifer and geology sensitivity to recharge water quality and type;
- (g) the potential impacts of abstraction; and
- (h) the end-use of the abstracted water.

(3) Risks are classified or described as either natural or industrial and include consideration of the following users or components of the aquifer -

- (a) the surrounding ecosystem;
- (b) the drinking water and human health;
- (c) the industries, such as stock drinking water and irrigation; and
- (d) the surrounding aquifers and water reserve.

(4) The operator referred to in subregulation (1) must submit the water safety plan to the Minister for approval.

(5) On receipt of the water safety plan contemplated in subregulation (4) the Minister must consider the plan and he or she may -

- (a) approve the plan if he or she is of the opinion that it ensures; or
- (b) refuse to approve the plan if he or she is of the opinion that it does not ensure,

the safety of drinking water.

(6) If the Minister -

- (a) pursuant to subregulation (5)(a), approves the water safety plan the Minister must, in writing, inform the operator of the approval; or

- (b) pursuant to subregulation (5)(b), refuses to approve the water safety plan the Minister must, in writing, inform the operator and provide to the operator the reasons for the refusal.

(7) Subject to subregulation (8), an approved water safety plan must be audited annually by a person or persons appointed or designated by the Minister.

(8) The Minister may cause an approved water safety plan to be audited more regularly than once a year if he or she considers it necessary.

Incident occurrence

58. (1) If any incident with negative impacts or consequences occurs at an artificial recharge scheme or with regard to the water safety plan, the operator must compile an incident report in writing and lodge it with the Minister.

(2) Depending on the severity of the incident referred to in subregulation (1), the Minister may require the operator to perform additional monitoring of the water safety plan or to adjust the risk program or to do both.

Protection of aquifers

59. The operator of an artificial recharge scheme must ensure that at all times the aquifer is protected against any form of pollution, including pollution caused due to operational activities during aquifer recharge.

Water quality standards and monitoring

60. The operator of an artificial recharge scheme must monitor -

(a) in order to assess the effectiveness of the aquifer recharge system, the water quality of the aquifer by compliance testing of the end product which determines the final drinking water quality by capturing normal operation, individual events and compliance to the water quality guidelines and standards contemplated in regulation 4; and

(b) the water quality of the recharge water which -

(i) aims to capture normal operation, possible seasonal variation and individual events in the injected water quality; and

(ii) must comply with prescribed water quality guidelines or standards,

according to its water safety plan and risk assessment.

Retention period

61. When an aquifer is used as a natural buffer for reclaimed water, the retention time in the artificial recharge system will depend on the failure and response time -

(a) which is the maximum time between when a failure occurs in the reclamation system and until the system has reacted such that the final water quality is no longer affected; and

(b) which time can vary between hours and weeks.

Treatment

62. If any treatment is required to rectify the water quality of an aquifer or the water quality of recharge water, the treatment must be done according to the recommendation of the risk assessment and water safety plan.

PART 7**DRILLER'S LICENSES****Categories of driller's licenses and technical requirements for person to be eligible for driller's licence of specified category**

63. (1) The categories of driller's licenses contemplated in section 67(1) of the Act are as set out in Column 1 of Annexure 10 in respect of the drilling method set out in Column 2 of that Annexure.

(2) The technical requirements to be complied with by a person in order to be eligible to be granted a driller's licence of a specified category contemplated in subregulation (1) are as set out in columns 3 to 13 of Annexure 10.

Application for driller's licence

64. (1) A person who intends to apply for a licence under section 67(3) of the Act must apply to the Executive Director on a form approved by the Minister which form is obtainable from the offices or official website of the Ministry.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 8 of Annexure 20 or proof of payment of that fee.

Contravention of, non-compliance with, or causing or permitting of person to contravene, condition to which driller's licence is subject

65. (1) A holder of a driller's licence who contravenes or fails to comply with, or causes or permits a person to contravene or fail to comply with, a condition to which the licence is subject commits an offence and on conviction is liable to a penalty determined by the Minister under section 67(8)(c) of the Act which penalty may not exceed N\$50 000.

(2) A penalty contemplated in subregulation (1) is payable to a staff member of the Ministry designated by the Executive Director as the person who is responsible for receiving or collecting fees incurred under these regulations.

PART 8**WATER POLLUTION CONTROL****Application for licence to discharge effluent or construct or operate wastewater treatment facility or waste disposal site**

66. (1) A person who intends to apply for a licence under section 72 of the Act must apply to the Executive Director on a form approved by the Minister which form is obtainable from the offices or official website of the Ministry.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 9 of Annexure 20 or proof of payment of that fee.

Quality standards with which effluent discharged must comply

67. Effluent discharged must comply with the water quality standards set out in Annexure 11.

Requirements relating to the reclamation and recycling of potable water from treated wastewater

68. (1) The reclamation and recycling of potable water from treated wastewater is subject to any provision of these regulations which relate to the production, purification and supply of drinking water.

(2) The special standard specifications for potable water quality contained in Tables 2.1, 2.2 and 2.3 of Annexure 2 apply in respect of subregulation (1).

(3) A person who holds a licence to discharge effluent or construct or operate wastewater treatment facility or waste disposal must, for purposes of reclaiming and recycling potable water from treated wastewater, ensure that the production of a treatment process incorporates a design with more than one removal process for any contaminant.

(4) A person who holds a licence to discharge effluent or construct or operate wastewater treatment facility -

- (a) may not reclaim, recycle or re-use waste derived from treated wastewater; and
- (b) must dispose off any waste derived from treating wastewater, as specified in the conditions of the licence.

Re-use of treated wastewater

69. Subject to any conditions prescribed under these regulations or imposed by the Minister, treated wastewater may be used for the re-use applications contemplated in Annexure 2, namely for purposes of -

- (a) mining and industrial re-use, as specified in Table 2.1;
- (b) agricultural re-use, as specified in Table 2.2;
- (c) landscape irrigation, as specified in Table 2.3; or
- (d) aquaculture, as specified in Table 2.4.

Renewal of licence to discharge effluent or construct or operate wastewater treatment facility or waste disposal site

70. (1) The holder of a licence to discharge effluent or construct or operate wastewater treatment facility or waste disposal site who intends to renew that licence must apply to the Executive Director in the manner contemplated in regulation 66(1) and within 90 days before the expiry date of that licence, for the renewal of that licence.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 10 of Annexure 20 or proof of payment of that fee.

Application fee for transfer of licence to discharge effluent or construct or operate wastewater treatment facility or waste disposal site

71. (1) A licence holder who intends to transfer a licence to discharge effluent or construct or operate wastewater treatment facility or waste disposal site must apply to the Executive Director in the manner contemplated in regulation 66(1).

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 11 of Annexure 20 or proof of payment of that fee.

PART 9**DAMS, DAM SAFETY AND FLOOD MANAGEMENT****Classification of dams**

72. For purposes of the classification of dams into categories as contemplated in section 129(1)(i) of the Act, the wall height of a dam set out in Column 1 of Annexure 12 determines the classification of the dam into the categories mentioned opposite the wall height in Column 2 of that Annexure as -

- (a) a small dam, being a Category 1 dam;
- (b) a medium dam, being a Category 2 dam; or
- (c) a large dam, being a Category 3 dam.

Requirements for construction, maintenance or repairing of dams

73. A person who intends to construct, repair or maintain a dam must ensure that the construction, repairing or maintenance of the dam complies with the requirements set out in regulations 74 to 77, 78 to 82 or 83 to 88 in respect of the category of that dam.

Design report in respect of Category 1 dam

74. (1) A person who intends to undertake a project to construct, alter or repair a Category 1 dam must -

- (a) design or obtain the services of a professional engineer to design, the proposed project and draw up plans and specifications of the proposed project; and
- (b) submit to the Minister a design report in respect of the proposed project.

(2) A design report in respect of a Category 1 dam must include the information contemplated in Annexure 25 and must be accompanied by the engineering drawings contemplated in regulation 75.

Engineering drawings in respect of Category 1 dam

75. The engineering drawings in respect of a Category 1 dam must show -

- (a) the general locality of the dam, with an indication of access routes from the nearest local authority area;
- (b) the contour plan of the dam up to at least one metre above the non-overspill crest height;

- (c) the general layout of the proposed works;
- (d) the typical particulars of the various sections or zones of the wall, including -
 - (i) the outlet works;
 - (ii) the spillway;
 - (iii) foundation excavation and treatment;
 - (iv) the wall and foundation drainage; and
 - (v) special or unusual characteristics;
- (e) in the case of an enlargement, alteration or repair of existing works, particulars of the connection between existing and new works;
- (f) the nature and locality of any development within and adjacent to the flooded area within the dam;
- (g) areas in and adjacent to the dam where access to the public is restricted;
- (h) the particulars on a plan of suitable scale of the nature and locality of development downstream of the dam in an area that could be threatened during floods or by a failure of the dam; and
- (i) the particulars on a plan of suitable scale of the locality of other dam projects in the catchment area upstream of the proposed works that could influence its safety in the event of an emergency occurring at those dams.

Safety of existing development affected by Category 1 dam

76. (1) An evaluation of a project in respect of a Category 1 dam must, subject to regulation 89, be carried out by the owner of the project or a person appointed by the owner to do so if -

- (a) any existing development may be submerged or adversely affected by a reservoir formed by the construction, enlargement, repair or alteration of the dam;
 - (b) any existing development may be affected by changes in natural flood levels caused by the construction, enlargement, repair or alteration of the dam; or
 - (c) the hydraulic and geometric characteristics of a watercourse may be transformed by the construction, enlargement, alteration or repair of the dam, with the result that there could be a significant increase in the risk of harm to persons, damage to property, or damage to resource quality.
- (2) The evaluation contemplated in subregulation (1) must include -
- (a) upstream development, downstream development and river crossings that may be affected by the dam;
 - (b) a detailed description of the -
 - (i) existing development or crossings;

- (ii) locality;
 - (iii) current use including recreation; and
 - (iv) frequency of pedestrians, vehicles or other type of traffic;
- (c) an assessment of the hazards that the development and crossings are subjected to during normal use, dry and normal river flow conditions and floods and the potential loss of life during the various conditions;
- (d) if applicable, proposals for the replacement, relocation or compensation of existing development; and
- (e) if applicable, proposals for the provision of an alternative safe crossing or other reasonable access such that anticipated risks to persons, property, animals or other type of traffic are not higher than the risks at the original crossing prior to the construction, enlargement, alteration or repair of a dam with a safety risk.

Additional information with regard to design report, engineering drawings and safety of existing development affected by Category 1 dam

77. If requested in writing by the Minister, the owner of a Category 1 dam must submit to the Minister information additional to the information contemplated in regulations 74, 75 and 76 in respect of a Category 1 dam.

Design report in respect of Category 2 dam

78. (1) A person who intends to undertake a project to -
- (a) construct a Category 2 dam; or
 - (b) enlarge, alter or repair an existing dam so that the completed dam will be classified as a Category 2 dam,
- must -
- (i) design, or obtain the services of a professional engineer to design, the proposed project and draw up plans and specifications of the proposed project; and
 - (ii) submit to the Minister a design report in respect of the proposed project.
- (2) A design report in respect of a Category 2 dam must include the information contemplated in Annexure 26 and must be accompanied by the project specifications contemplated in regulation 79 and the engineering drawings contemplated in regulation 80.

Project specifications in respect of Category 2 dam

79. A person who is registered as a civil engineer in terms of the Engineering Profession Act, 1986 (Act No. 18 of 1986) or a professional engineer must compile project specifications in respect of a Category 2 dam for the construction of the dam and related structures, wherein the following is specified -

- (a) the requirements with which construction and foundation materials must comply;
- (b) the procedures that must be followed for the construction of the dam;

- (c) the permissible tolerances for the finishing of structural parts; and
- (d) the particulars of quality control to be applied.

Engineering drawings in respect of Category 2 dam

- 80.** The engineering drawings in respect of a Category 2 dam must show -
- (a) the general locality of the dam, with an indication of access routes from the nearest local authority area;
 - (b) the contour plan of the dam up to at least one metre above the non-overspill crests height;
 - (c) the general layout of the proposed works;
 - (d) the typical particulars of the dam, including the -
 - (i) wall;
 - (ii) outlet works;
 - (iii) spillways;
 - (iv) foundation excavation and treatment;
 - (v) wall and foundation drainage;
 - (vi) joint grouting; and
 - (vii) instrumentation and special or unusual characteristics;
 - (e) in the case of the enlargement, alteration or repair of existing works, particulars of the connection between existing and new works;
 - (f) the particulars of river diversion work, if applicable;
 - (g) the nature and locality of any development within and adjacent to the flooded area of the dam as well as areas where access to the public is restricted;
 - (h) the particulars on a plan of suitable scale of the nature and locality of infrastructure and development downstream of the dam in an area that could be threatened during floods or by a failure of the dam; and
 - (i) the particulars on a plan of suitable scale of the locality of other dam projects in the catchment area upstream of the proposed works that could influence its safety in the event of an emergency occurring at one or more of the upstream projects.

Safety of existing development affected by Category 2 dam

- 81.** (1) An evaluation of a project in respect of a Category 2 dam must, subject to regulation 90, be carried out by a professional engineer if -
- (a) existing development may be submerged or adversely affected by a reservoir formed by the construction, enlargement, repair or alteration of the dam;

- (b) existing development may be affected by changes in natural flood levels caused by the construction, enlargement, repair or alteration of the dam; or
 - (c) the hydraulic and geometric characteristics of a watercourse may be transformed by the construction, enlargement, alteration or repair of the dam, with the result that there could be a significant increase in the risk of harm to persons, damage to property, or damage to resource quality.
- (2) The evaluation contemplated in subregulation (1) must include -
- (a) upstream development, downstream development and river crossings that may be affected by the dam;
 - (b) a detailed description of the -
 - (i) existing development or crossings;
 - (ii) locality;
 - (iii) current use, including recreation; and
 - (iv) frequency of pedestrians, vehicles or other type of traffic;
 - (c) an assessment of the hazards that the development and crossings are subjected to during normal use, dry and normal river flow conditions and floods, and the potential loss of life during the various conditions;
 - (d) if applicable, proposals for the replacement, relocation or compensation of existing development; and
 - (e) if applicable, proposals for the provision of an alternative safe crossing or other reasonable access such that anticipated risks to persons, property, animals or other type of traffic are not higher than the risks at the original crossing prior to the construction, enlargement, alteration or repair of a dam with a safety risk.

Additional information related to design report, project specifications, engineering drawings and safety of existing development affected by Category 2 dam

82. If requested by the Minister in writing, the owner of a Category 2 dam must submit to the Minister information additional to the information contemplated in regulations 77, 78, 79 and 81 in respect of a Category 2 dam.

Professional team and independent experts

- 83.** (1) A person who intends to undertake a project to -
- (a) construct a Category 3 dam; or
 - (b) enlarge, alter or repair an existing dam so that the completed dam will be classified as a Category 3 dam,

must obtain the services of a professional engineer to design the proposed project and to draw up plans and specifications of the proposed project.

- (2) The Minister may, with the assistance of a professional team, approve -
- (a) proposed projects, in respect of Category 3 dams, designed; and
 - (b) plans and specifications of proposed projects in respect of Category 3 dams drawn up,

by the professional engineer contemplated in subregulation (1).

- (3) In the case of a dispute or if the Minister is of the opinion that -
- (a) a project contemplated in subregulation (2) is an extraordinarily large project;
 - (b) unusual design principles or methods of analysis have been used;
 - (c) unusual construction procedures or construction materials have been specified; or
 - (d) extraordinary circumstances exist,

the Minister may require that the owner of the proposed project appoint, at own cost and subject to subregulation (4), an independent expert or a professional team to -

- (i) evaluate the proposed project taking into account the design, drawings, specifications, anticipated circumstances during the construction, of the dam or any anticipated circumstances when filling water into the dam; and
- (ii) submit to the Minister a report of the findings of the evaluation under subparagraph (i).

(4) An independent expert or a professional team appointed by the owner of a proposed project must not commence with the evaluation under subregulation (3)(i) unless the owner has obtained written approval, of the appointment of that independent expert or professional team, from the Minister.

(5) Any change in the membership or composition of a professional team contemplated in subregulation (3) or if a project owner intends to replace an independent expert, that change or replacement must be submitted to the Minister for approval before the change or replacement is made.

Design report in respect of Category 3 dam

84. A professional engineer must compile a design report in respect of a Category 3 dam and that report must include the information contemplated in Annexure 27 and it must be accompanied by the project specifications contemplated in regulation 85 and the engineering drawings contemplated in regulation 86.

Project specifications in respect of Category 3 dam

85. A professional engineer must compile project specifications in respect of a Category 3 dam for the construction of the dam and related structures, wherein the following is specified -

- (a) the requirements with which construction and foundation materials must comply;

- (b) the procedures that must be followed for the construction of the dam;
- (c) the permissible tolerances for the finishing of structural parts; and
- (d) the particulars of quality control to be applied.

Engineering drawings in respect of Category 3 dam

86. The engineering drawings in respect of a Category 3 dam must show -

- (a) the general locality of the dam, with an indication of access routes from the nearest local authority area;
- (b) the contour plan of the dam up to at least one metre above the non-overspill crests height;
- (c) the general layout of the proposed works;
- (d) the typical particulars of the dam, including the -
 - (i) wall;
 - (ii) outlet works;
 - (iii) spillways;
 - (iv) foundation excavation and treatment;
 - (v) wall and foundation drainage;
 - (vi) joint grouting; and
 - (vii) instrumentation and special or unusual characteristics;
- (e) in the case of the enlargement, alteration or repair of existing works, particulars of the connection between existing and new works;
- (f) the particulars of river diversion work, if applicable;
- (g) the nature and locality of any development within and adjacent to the flooded area of the dam as well as areas where access to the public is restricted;
- (h) the particulars on a plan of suitable scale of the nature and locality of infrastructure and development downstream of the dam in an area that could be threatened during floods or by a failure of the dam; and
- (i) the particulars on a plan of suitable scale of the locality of other dam projects in the catchment area upstream of the proposed works that could influence its safety in the event of an emergency occurring at one or more of the upstream projects.

Safety of existing development affected by Category 3 dam

87. (1) An evaluation of a project in respect of a Category 3 dam must be carried out by a professional engineer assisted by a professional team if -

- (a) existing development may be submerged or adversely affected by a reservoir formed by the construction, enlargement, repair or alteration of the dam;
 - (b) existing development may be affected by changes in natural flood levels caused by the construction, enlargement, repair or alteration of the dam; or
 - (c) the hydraulic and geometric characteristics of a watercourse may be transformed by the construction, enlargement, alteration or repair of the dam, with the result that there could be a significant increase in the risk of harm to persons, damage to property, or damage to resource quality.
- (2) The evaluation contemplated in subregulation (1) must include -
- (a) upstream development, downstream development and river crossings that may be affected by the dam;
 - (b) a detailed description of the -
 - (i) existing development or crossings;
 - (ii) locality;
 - (iii) current use including recreation; and
 - (iv) frequency of pedestrians, vehicles or other type of traffic;
 - (c) an assessment of the hazards that the development and crossings are subjected to during normal use, dry and normal river flow conditions and floods, and the potential loss of life during the various conditions;
 - (d) if applicable, proposals for the replacement, relocation, or compensation of existing development; and
 - (e) if applicable, proposals for the provision of an alternative safe crossing, or other reasonable access such that anticipated risks to persons, property, animals or other type of traffic are not higher than the risks at the original crossing prior to the construction, enlargement, alteration or repair of a dam with a safety risk.

Additional information related to design report, project specifications, engineering drawings and safety of existing development affected by Category 3 dam

88. If requested by the Minister in writing, the owner of a Category 3 dam must submit to the Minister information additional to the information contemplated in regulations 84, 85, 86 and 87 in respect of a Category 3 dam.

Dam safety evaluation in respect of Category 1 dam

- 89.** (1) The owner of a Category 1 dam must -
- (a) submit at own cost, if requested to do so by the Minister in writing, an evaluation report on the safety of the dam within a period specified by the Minister in accordance with subregulations (2) and (3);
 - (b) submit further dam safety evaluation reports at intervals of between five and 10 years if requested by the Minister; and

- (c) regularly report to the Minister on progress with the implementation of the recommendations made in the dam safety evaluation report until all recommendations have been addressed.
- (2) Dam safety evaluation reports in respect of Category 1 dams must include the following information -
- (a) a description of the project of which the dam is part;
 - (b) details of the dam, including -
 - (i) the type of wall;
 - (ii) the maximum wall height of the dam;
 - (iii) the storage capacity of the dam;
 - (iv) the surface area of the dam at full supply level;
 - (v) the total crest length of the wall;
 - (vi) the crest width of the wall;
 - (vii) the upstream and downstream slopes of the wall;
 - (viii) a description of the materials in different zones of the wall, including slope protection measures, if applicable;
 - (ix) a description of the general nature and distribution of materials forming the foundation of the dam;
 - (x) a description of drainage and seepage control measures;
 - (xi) a description of the outlet works of the dam; and
 - (xii) the completion date of the construction of the dam;
 - (c) hydrological particulars and flood estimates, including -
 - (i) the catchment area;
 - (ii) the catchment parameters;
 - (iii) the mean annual precipitation;
 - (iv) the methods used for flood estimates;
 - (v) the design flood and the estimated annual exceedance probability thereof;
 - (vi) the regional maximum flood, if applicable, depending on the size of the catchment area;
 - (vii) the safety evaluation flood and the estimated annual exceedance probability thereof; and

- (viii) the guidelines used for the choice of alternative floods used to evaluate the adequacy of the spillway;
 - (d) a description and evaluation of the spillways, including -
 - (i) the type of spillway;
 - (ii) the crest length of the spillway;
 - (iii) the height difference between the spillway crest and lowest level of the non-overspill crest;
 - (iv) the dimensions of all possible hydraulic control sections;
 - (v) the length of the spillway return channel, if applicable;
 - (vi) the maximum discharge capacity of the spillway before overtopping of the non-overspill crest;
 - (vii) the freeboard during the design flood; and
 - (viii) the expected damage or erosion during various floods;
 - (e) an evaluation of the safety, structural stability, operating procedures and the maintenance of the dam based on the inspection carried out in accordance with subregulation (3);
 - (f) the name of the designer of the dam and contractor;
 - (g) the remedial works since completion of the dam;
 - (h) the major problems, which occurred previously;
 - (i) a description of the observations and findings made during the on-site inspection carried out in accordance with subregulation (3);
 - (j) a site plan of the project;
 - (k) the plans, elevations and sections that show characteristic features of the dam and spillway; and
 - (l) an appropriate number of colour photographs that reflect the observations made during the on-site inspection.
- (3) An owner or person appointed by the owner of a Category 1 dam, must carry out an on-site inspection in respect of the dam if note is taken of -
- (a) the general condition of the crest, upstream face and downstream face of the dam wall such as the presence and size of trees, erosion gullies and other irregularities;
 - (b) the position and size of any wet patches or leakages through the wall or foundation thereof, mentioning the turbidity and flow rate of any leaking water;
 - (c) the position and extent of any cracks, subsidence, bulges or signs of relative movement on any part of the dam wall;

- (d) the position and size of holes or nests made by burrowing animals, rodents or insects;
- (e) the condition of the spillway, including any erosion thereof in the area directly upstream or downstream of the spillway;
- (f) the condition and serviceability of the outlet works of the dam;
- (g) the effectiveness of precautions and measures to ensure public safety such as -
 - (i) the designation of restricted areas such as -
 - (aa) the dam wall or certain portions of the dam wall;
 - (bb) the entrance to the spillway;
 - (cc) the spillway;
 - (dd) the spillway return channel;
 - (ee) energy dissipaters;
 - (ff) plunge pool;
 - (gg) outlet works;
 - (hh) any other ancillary structures on or near the dam;
 - (ii) a specified zone of a reservoir upstream of the dam wall between the left bank and right bank; and
 - (jj) a specified zone of the river downstream of the dam between left bank and right bank;
 - (ii) the provision of a floating safety boom upstream of the spillway, if applicable;
 - (iii) the provision of safe access within certain areas of the dam wall or ancillary structures;
 - (iv) if applicable, the provision of parapet walls, handrails, guard rails, fences or vehicle barriers;
 - (v) the provision of appropriate warning signs at the dam wall and ancillary structures; and
 - (vi) the provision of appropriate warning signs related to the use of the dam for recreational purposes, at or nearby the dam wall, if required by the Minister;
- (h) any buildings or developed areas downstream of the wall that could be threatened by floodwater due to failure of the dam;
- (i) any adverse impact on resource quality as a result of failure of the dam; and
- (j) any other aspect related to the safety of the dam or hazard potential due to the existence of the dam.

Dam safety evaluation in respect of Category 2 dams and Category 3 dams

90. (1) The owner of a Category 2 dam or a Category 3 dam must -
- (a) submit at own cost, if requested to so by the Minister in writing, an evaluation report on the safety of the dam within the period specified by the Minister in accordance with subregulations (2), (3), (4), (5), (6) and (7);
 - (b) have a first dam safety evaluation of a newly completed dam carried out at his or her expense within three years of the functional completion of the dam;
 - (c) have further dam safety evaluations carried out at intervals of not more than five years, but the Minister may increase the length of the interval period to a maximum of 10 years, taking into account the condition of the dam; and
 - (d) regularly report to the Minister on progress with the implementation of the recommendations made in the dam safety evaluation report until all recommendations have been addressed.
- (2) A dam safety evaluation and on-site inspection of a -
- (a) Category 2 dam must be carried out by a professional engineer;
 - (b) Category 3 dam must be carried out by a professional engineer assisted by a professional team,

to identify any actual or potential shortcomings in the condition of the dam or in the quality and adequacy of the procedures followed for the maintenance, operation and monitoring of behaviour that might endanger human lives, damage of property or have an adverse impact on resource quality.

(3) The professional engineer concerned must compile, subject to subregulations (4) and (6), a report on the dam safety evaluation and submit it to the Minister within the period that the Minister may determine, and the Minister may refer the report back for improvement if the report -

- (a) contains incorrect information;
 - (b) is incomplete; or
 - (c) does not comply with dam engineering criteria contemplated in these regulations.
- (4) A dam safety evaluation referred to in subregulation (2) must include the following -
- (a) a study of all existing reports on the design, construction and safety of the dam and related matters;
 - (b) an on-site inspection during which -
 - (i) available data on the condition and structural behaviour of the dam and its foundations are inspected and assessed;
 - (ii) note is taken of -
 - (aa) any visible signs of subsidence, movement, cracking, internal stress, erosion, sink-holes, seepage, leakage and ageing of materials;

- (bb) the functioning of drainage and pressure relief systems;
 - (cc) the extent and height of vegetation;
 - (dd) the presence and size of trees; and
 - (ee) anything else that may affect the safety of the dam;
- (iii) the serviceability of equipment used to regulate floodwater or dam water-levels and to draw down the water-level quickly in an emergency is investigated; and
 - (iv) note is taken of the level of supervision, keeping of records required in accordance with the operation and maintenance manual, operating rules, warning systems and the security measures at the dam;
- (c) an assessment of the geological conditions on site and of the stability of slopes near the dam and around the dam rim;
 - (d) an evaluation based on available information of -
 - (i) the adequacy of the spillways and floodgates, if applicable, including the possibility that one or more floodgates cannot be opened or the possibility that flow may be obstructed by floating objects, such as, boats, jetties, trees, logs and debris;
 - (ii) the consequences of overtopping of the non-overspill crest;
 - (iii) the potential loss of life, potential economic loss, and damage to resource quality as a result of a failure of the dam;
 - (iv) the structural adequacy and stability of structures under the effect of normal and abnormal load conditions;
 - (v) applicable hydrological data collected since the dam was constructed or since any previous dam safety evaluation in terms of these regulations or any regulation made in terms of a law repealed by the Act;
 - (vi) the behaviour of the dam, with due consideration of the available monitoring instrument observations or data;
 - (vii) the quality and adequacy of the level of operation and maintenance, monitoring programme, and emergency procedures to reduce the potential for harm to human lives, damage to property or to resource quality; and
 - (viii) precautions to safeguard members of the public who gain unrestricted access to the dam and appurtenant works against accidents, including the adequacy of a floating safety boom upstream of the spillway, if applicable.
 - (e) if applicable and in the case of dams equipped with floodgates, an evaluation of the adequacy of -
 - (i) the security measures to prevent unauthorised persons access to the dam, critical parts of the dam or appurtenant works, but confidentiality of sensitive information must be observed if necessary;

- (ii) the warning systems to alert the dam operator of incoming floods;
 - (iii) the warning systems to warn persons downstream of the dam of floods or flow releases;
 - (iv) the gate operating rules, operational systems and personnel;
 - (v) the alternative power supply in the event of a power failure; and
 - (vi) the structural adequacy of all elements of the floodgates;
- (f) an evaluation of the safety of existing development upstream and downstream of the dam wall as set out in regulations 81 and 96 in respect of Category 2 dams and Category 3 dams, respectively.
- (5) A professional engineer when carrying out a dam safety evaluation must -
- (a) compile a diagram, sketch or drawing showing actual surveyed levels at appropriate intervals along the non-overspill crest of the dam and the crest of the spillway to verify the total freeboard of the dam, and if the spillway of a dam is an excavated channel where the full supply level is not well defined, several lines of levels must be shown;
 - (b) ensure that adequate level determinations are available for the dam safety evaluation concerned.
- (6) A dam safety evaluation report submitted in respect of a dam in terms of these regulations must also contain the following information -
- (a) a concise description of the project of which the dam is part;
 - (b) a site plan of the project;
 - (c) the plans, elevations and sections that show the characteristic features of the dam and the position of any monitoring instruments, as well as a diagram, sketch or drawing contemplated in subregulation (5)(a) and (b);
 - (d) a summary of the design assumptions, design analyses, design flood data and safety factors used during the design phase to evaluate the structural adequacy and stability of the dam;
 - (e) if applicable, hydrological particulars of the project, including -
 - (i) the catchment area;
 - (ii) the catchment parameters;
 - (iii) the mean annual precipitation;
 - (iv) the storage capacity of the dam;
 - (v) the surface area of the dam at full supply level;
 - (vi) the elevation versus capacity and elevation versus surface area curves for the dam;

- (vii) the design flood and the estimated annual exceedance probability thereof, assuming that the existing dam is being designed as a “new dam”;
 - (viii) the regional maximum flood, if applicable, depending on the size of the catchment area;
 - (ix) the safety evaluation flood and the estimated annual exceedance probability thereof;
 - (x) particulars of the design flood hydrograph, indicating the criteria, data source and methods used to determine the floods;
 - (xi) particulars of a flood hydrograph, which, when routed through the dam, would be attenuated in a manner that the outflow hydrograph flood peak is the same value as the maximum discharge capacity of the spillway; and
 - (xii) inflow and outflow hydrographs for design flood and safety evaluation flood conditions when significant attenuation of a flood entering the dam is expected, with a full motivation for the selection of attenuated floods;
- (f) a description and evaluation of the spillway, including -
- (i) the type of spillway;
 - (ii) the crest length of the spillway;
 - (iii) the height difference between the spillway crest and lowest level of the non-overspill crest;
 - (iv) the dimensions of all possible hydraulic control sections;
 - (v) the length of the spillway return channel, if applicable;
 - (vi) the maximum capacity of the spillway;
 - (vii) the freeboard during the design flood; and
 - (viii) the expected damage or erosion during various floods;
- (g) a summary of the geological and geotechnical conditions that could affect the safety of the dam, but if any of the said geological or geotechnical information is not available or is inadequate, the professional engineer must indicate in his or her report what additional information or investigations are required;
- (h) an analysis of the safety and stability of the dam and the operating procedures and the maintenance of the dam, based on the inspections, assessment and evaluations effected by the professional engineer in terms of subregulation (4), as well as reference to the methods used, assumptions made and standards applied for the evaluation as required therein, including, in the case of a Category 3 dam, the characteristic results obtained in the process of evaluation in terms of subregulation (4)(d);
- (i) the identification of any change in respect of the information required in terms of subregulation (4) that has come into effect since the last dam safety evaluation, and an analysis of the effects of any change;

- (j) if the dam is equipped with monitoring instruments, the monitored information to provide a representative picture of the results upon which assessments of the behaviour and safety have been based, the information being presented graphically to represent the changes over time on a scale that makes it possible to distinguish trends in the pattern of behaviour, and including a drawing to indicate the position and distribution of instruments in the structure;
- (k) an analysis of the adequacy of the existing monitoring instrument installation, the monitoring programme and the programme of the owner for periodic inspections of the dam in the light of the potential threat to human life, damage to property and any adverse impact on resource quality;
- (l) a dam safety risk analysis or risk assessment on the dam or both a dam safety risk analysis and risk assessment on the dam and an indication of the probabilities of failure, if requested in writing so by the Minister;
- (m) particulars of the precautions and measures to ensure public safety such as -
 - (i) the designation of restricted areas such as -
 - (aa) the dam wall or certain portions thereof;
 - (bb) the entrance to the spillway;
 - (cc) the spillway;
 - (dd) the spillway return channel;
 - (ee) energy dissipaters;
 - (ff) plunge pool;
 - (gg) outlet works;
 - (hh) any other ancillary structures on or near the dam;
 - (ii) a specified zone of a reservoir upstream of the dam wall between the left bank and right bank; and
 - (jj) a specified zone of the river downstream of the dam between left bank and right bank;
- (ii) the provision of a floating safety boom upstream of the spillway, if applicable;
- (iii) the provision of safe access within designated areas of the dam wall or ancillary structures;
- (iv) if applicable, the provision of parapet walls, handrails, guard rails, fences or vehicle barriers;
- (v) the provision of appropriate warning signs at the dam wall and ancillary structures; and

- (vi) the provision of appropriate warning signs related to the use of the dam for recreational purposes, at or nearby the dam wall, if required by the Minister;
 - (n) recommendations by the professional engineer based on his or her inspections, assessments, analyses and evaluations as required in terms of these regulations, with regard to -
 - (i) any corrective measures required to reduce to acceptable levels actual or potential shortcomings in the condition of the dam or in the quality and adequacy of the procedures for the maintenance, operation and monitoring of the dam or emergency preparedness plans as well as keeping of records in accordance with the operation and maintenance manual;
 - (ii) the urgency in respect of the taking of corrective measures;
 - (iii) updating or upgrading the operation and maintenance manual and emergency preparedness plan for the dam, but if there is no operation and maintenance manual and emergency preparedness plan for the dam, a statement must be made with regard to the need for such documents to be compiled in terms of these regulations;
 - (iv) the need for further studies to investigate any potential shortcomings; and
 - (v) any additional monitoring instruments, evaluations, inspections or observations considered necessary;
 - (o) if any evaluation, analysis and summary referred to in paragraphs (d), (e), (f), (g), (h) and (k) amount only to a confirmation of the findings of a previous dam safety evaluation, a summary of those findings must be included in the report, with a full reference to the previous report in which the evaluation, analysis and summary were set out;
 - (p) an appropriate number of annotated colour photographs that reflect the observations or findings made during the on-site inspection;
 - (q) a list of all professional staff who have taken part in the inspection evaluation or compilation of the report; and
 - (r) the signature of the professional engineer responsible for the dam safety evaluation.
- (7) The contents of the dam safety evaluation report referred to in subregulation (6) must be limited to the information necessary to support the findings and recommendations contained in the dam safety evaluation.

Additional requirements for dam safety evaluation in respect of Category 3 dam

- 91.** In addition to regulation 90 -
- (a) if requested in writing by the Minister, a dam safety risk analysis or risk assessment or both a dam safety risk analysis and a dam safety risk assessment must be carried out on the dam and an indication of the probabilities provided; and
 - (b) the members of the professional team must sign the relevant sections of the report for which they are responsible,

in the case of a Category 3 dam.

Registration of existing dams

92. (1) A person who owns an existing dam in Namibia must within 180 days after the commencement of these regulations make an application for the registration of the dam to the Executive Director on a form approved by the Minister which form -

- (a) as a minimum requires the information set out in Annexure 15; and
- (b) is obtainable from the offices or the official website of the Ministry.

(2) The application contemplated in subregulation (1) must be accompanied by the registration fee set out in item 12 of Annexure 20 or proof of payment of that fee.

(3) The Minister must consider every application made to the Executive Director under subregulation (1) and may by written notice given to the owner require the owner to -

- (a) provide any further information specified in the notice within the period specified in the notice; or
- (b) participate in an investigation specified in the notice designed to enable the Minister to assess the likely effects of the registration and to bear the full costs of the investigation or such part of those costs as specified by the Minister in the notice.

(4) After consideration of the application contemplated in subregulation (1), including further information submitted to him or her, the Minister must -

- (a) register the dam and inform the owner in writing of the registration; and
- (b) issue to the owner a registration certificate in the form approved by the Minister.

Register of registered dams

93. (1) The Minister must keep a register of dams registered as contemplated in regulation 92 in such form as the Minister approves.

(2) The register referred to in subregulation (1) must contain at least the following information about each registered dam -

- (a) the location of the dam by means of global positioning system (GPS) coordinates;
- (b) the name of the farm or other land, public or private, where the dam is located, and the official name of the dam, if any;
- (c) the name, address and contact particulars of the owner of the dam;
- (d) the number and date of the permit, other consent or approval, if any, to construct the dam;
- (e) the year the dam was constructed, and, if applicable, the year any permitted structured alterations were made to the dam;
- (f) a description of the dam;
- (g) the use or uses of the dam, such as water supply, irrigation, hydropower or recreation; and

- (h) one or more photographs of the dam showing details of specific features like the upstream and downstream view of the embankment, spillway, abstraction works or any other feature of importance.

(3) A successor-in-title to an owner of a registered dam must inform the Minister in writing of the relevant details of the succession, and the Minister must cause the details to be recorded in the register referred to in subregulation (1).

Registration of dam with safety risk

94. (1) A person who owns a dam contemplated in section 94 of the Act must make an application for the registration of the dam to the Executive Director on a form approved by the Minister which form -

- (a) as a minimum requires the information set out in in Annexure 16; or
- (b) is obtainable from the offices or official website of the Ministry.

(2) The application contemplated in subregulation (1) must be accompanied by the registration fee set out in item 13 of Annexure 20 or proof of payment of that fee.

(3) The Minister must consider every application made to the Executive Director under subregulation (1) and may by written notice given to the owner require the owner -

- (a) to provide any further information specified in the notice within the period specified in the notice; or
- (b) to participate in an investigation specified in the notice designed to enable the Minister to assess the likely effects of the registration of the dam with a safety risk and to bear the full costs of the investigation, or such part of those costs as specified by the Minister in the notice.

(4) After consideration of the form referred to in subregulation (1), including further information submitted to him or her, the Minister must -

- (a) register the dam concerned with a safety risk and inform the owner in writing of the registration; and
- (b) issue to the owner a registration certificate in the form approved by the Minister.

Keeping of records, storage of documents, change of ownership and change of use of dam with safety risk

95. (1) The owner of a dam with a safety risk must keep detailed and up to date records of the dam which must include -

- (a) the operation and maintenance manual and emergency preparedness plan for the dam;
- (b) dam safety evaluation and investigation reports on the dam;
- (c) drawings of the dam and any reports on the geology, design, construction, maintenance, operation and improvements or changes to the dam;

- (d) in the case of a Category 2 dam or a Category 3 dam equipped with monitoring instruments, instrumentation observation data, and tables and graphs, that are kept continuously up to date to illustrate the data collected; and
 - (e) in the case of a Category 2 dam or a Category 3 dam, information regarding fluctuation of water-levels in the dam and flow in the river downstream of the dam wall, as requested by the Minister in writing in each particular instance.
- (2) The owner of a dam with a safety risk must -
- (a) safely store the records referred to in subregulation (1) or copies of those records at the dam site or in an office which is near the dam site; and
 - (b) make available for inspection by any staff member of the Ministry designated to do so by the Executive Director the records referred to in subregulation (1) or copies of those records.
- (3) If ownership or control of a dam with a safety risk is transferred to another person the owner of the dam must -
- (a) transfer the records of the dam concerned to the new owner of the dam within 60 days of the change of ownership of the dam;
 - (b) notify the Minister in writing, within 60 days after the change of ownership of the dam, of the change in ownership and that the records have been transferred to the new owner of the dam; and
 - (c) submit the name, address and contact particulars of the new owner or person in control of the dam to the Minister.
- (4) If a dam with a safety risk is unusable for any reason, including silting up, the owner of the dam must notify the Minister in writing thereof within 60 days after such an occurrence.
- (5) If a dam with a safety risk is to be used for any purpose other than that for which it was originally constructed, the owner or other person in control of the dam must notify the Minister in writing thereof at least 60 days before any change comes into effect.

Particulars to be contained in register of dams with safety risk

96. The register of dams with a safety risk referred to in section 97(1) of the Act must contain the following information about each dam registered with the safety risk -

- (a) the location of the dam by means of global positioning system (GPS) coordinates;
- (b) the name of the farm or other land where the dam is located and the official name of the dam, if any;
- (c) the name, address and contact particulars of the owner of the dam;
- (d) the number and date of the permit, other consent or approval, if any, to construct the dam;
- (e) the year the dam was constructed, and, if applicable, the year any structured alterations were made to the dam;

- (f) a description of the dam;
- (g) the use or uses of the dam such as water supply, irrigation, hydropower or recreation;
- (h) the hydrologic and hydraulic data related to the dam;
- (i) the seismic zone of the dam;
- (j) the safety risk of the dam; and
- (k) one or more photographs of the dam showing details of specific features like the upstream and downstream view of the embankment, spillway, abstraction works or any other feature of importance.

Manner and extent of monitoring of dams with safety risk

97. (1) The Minister may -
- (a) inspect or cause to be inspected any dam with a safety risk or test any component of that dam;
 - (b) direct the owner of the dam to have an inspection or test carried out or to have instruments for monitoring the behaviour of the dam installed;
 - (c) direct the owner to provide information in a form approved by the Minister on any matter affecting the safety of the dam or the protection of life, property and resource quality related to the existence of the dam;
 - (d) require that maintenance work and dam safety betterment work which according to a dam safety evaluation report are found to be necessary to be carried out under the supervision of a professional engineer;
 - (e) in consequence of a dam safety evaluation, require that further studies or investigations be undertaken by a professional engineer to investigate any potential defects; and
 - (f) determine a time for the submission of information or the taking of steps in terms of paragraphs (b), (c) and (e).
- (2) The owner of a dam with a safety risk must -
- (a) appoint a professional engineer to compile an operation and maintenance manual in accordance with regulation 98 and an emergency preparedness plan in accordance with regulation 99 and submit a copy to the Minister if requested by him or her in writing;
 - (b) keep the operation and maintenance manual and emergency preparedness plan up to date.
- (3) The owner of a dam with a safety risk must -
- (a) regularly inspect the dam or have it inspected using the guidelines for routine inspections described in the operation and maintenance manual to check whether all the components of the dam are in a satisfactory serviceable condition and are capable of performing the function for which they are intended;

- (b) as soon as a condition affecting the safety of a dam arises at the dam, investigate, or cause to be investigated and evaluate the circumstances and without delay take steps that are necessary to clear up or control the condition using the guidelines in the emergency preparedness plan;
- (c) when an emergency develops at the dam, immediately release information in accordance with the emergency preparedness plan to make it possible to evacuate threatened areas downstream of the wall;
- (d) report without delay to the Minister any emergencies that may develop at the dam and carry out any instructions arising there from;
- (e) within a period of 30 days provide the Minister with a written report containing full details of the circumstances giving rise to the emergency, of how the conditions developed or were controlled and of the nature and extent of the damage;
- (f) apply appropriate operational procedures to prevent people or property downstream of the dam from being flooded without warning by sudden changes in water-levels; and
- (g) furnish full co-operation and assistance in any investigation or inspection of any component of the dam being carried out at the direction of the Minister.

(4) The owner of a dam with a safety risk may appoint a professional engineer as the person in control of a dam with a safety risk.

Operation and maintenance manual in respect of dam with safety risk

- 98.** An operation and maintenance manual for a dam with a safety risk must include -
- (a) the names, addresses and contact particulars of the -
 - (i) owner and person in control of the dam;
 - (ii) representative of the owner or person who has been granted authority to issue instructions in connection with the operation of the dam;
 - (iii) person directly responsible for the day-to-day operation of the dam;
 - (iv) person responsible for the taking of monitoring instrument readings at the dam;
 - (v) person responsible for the regular evaluation of the monitoring instrument readings contemplated in subparagraph (iv); and
 - (vi) person responsible for routine inspections of the dam that must be carried out in accordance with the operation and maintenance manual;
 - (b) a description of the project and a concise description of the dam;
 - (c) detailed information, including the catchment area and a description of the downstream development, as well as -
 - (i) basic flood hydrological data;

- (ii) elevation versus capacity and elevation versus surface area curves for the dam; and
 - (iii) spillway and outlet discharge tables or curves for the dam;
- (d) a site plan of the project showing the dam and access routes to the dam;
- (e) a small scale map of the upstream and downstream river reach that would be affected in times of flood which -
 - (i) provides an overview of the river for the purpose of disaster management or operation of the dam during floods;
 - (ii) indicates developments within close proximity of the dam, including resorts, picnic spots and hiking trails; and
 - (iii) is not necessarily the same as detailed inundation maps required for an emergency preparedness plan;
- (f) a set of engineering drawings of the general layout of the dam and basic details of outlet works and spillway gates, if applicable;
- (g) plans, elevations and sections that show characteristic features of the dam to indicate important operating particulars, including the locality of -
 - (i) control points;
 - (ii) monitoring instruments;
 - (iii) access routes to the dam that could be used during floods;
 - (iv) slipways for boats for rescue operations; and
 - (v) areas where access to the public is restricted;
- (h) instructions for the maintenance of the civil components of the dam, including drainage systems, slope protection, hydraulic structures and other parts requiring maintenance;
- (i) instructions for the operation and maintenance of the mechanical and electrical components of the dam that are used for the control of floodwater or that could be used in an emergency to lower the water-level of the dam;
- (j) particulars of a regular inspection programme to check the condition and the serviceability of the various components of the dam, including an item list to serve as a guideline for inspections;
- (k) information on the layout, reading procedure and reading frequency of monitoring instruments, and particulars on the procedure for the processing and assessment of monitoring instrument readings, including guideline values for the assessment of monitoring instrument readings;
- (l) any limitations on the rate of releases or changes in the water-level of the dam;

- (m) in the case of a dam with an uncontrolled spillway, particulars on flood warning systems for incoming and outgoing floods, water-levels and water-level changes, where appropriate or applicable;
- (n) in the case of a dam with a controlled spillway, or a dam equipped with floodgates, particulars of the -
 - (i) gate operating rules, operational systems and required personnel;
 - (ii) limits on water-levels, water-level changes and rate of releases;
 - (iii) warning systems to alert the dam operator of floods or flow releases;
 - (iv) warning systems to alert persons downstream of the dam of floods or flow releases;
 - (v) measures to be implemented when one or more floodgates cannot be opened;
 - (vi) alternative power supply in the event of a power failure;
 - (vii) measures to remove and prevent obstructions caused by floating objects such as boats, jetties, trees, logs and other debris; and
 - (viii) security measures to prevent unauthorised persons access to the dam, critical parts of the dam or appurtenant works;
- (o) particulars on recording of observations and incidents, issuing of communications and instructions, filing and dispatching of reports, log book entries and recording deviations from an operating rule that relate to prevailing conditions when floods are released in a controlled or uncontrolled manner;
- (p) descriptions of circumstances at the dam that should be considered a condition affecting the safety of the dam, together with guidelines for the evaluation of conditions and procedures and actions to be followed to limit the impact of these circumstances on the works and downstream areas; and
- (q) precautions or measures to ensure public safety with regard to -
 - (i) the designation of restricted areas such as -
 - (aa) the dam wall or certain portions thereof;
 - (bb) the entrance to the spillway;
 - (cc) the spillway;
 - (dd) the spillway return channel;
 - (ee) energy dissipaters;
 - (ff) plunge pool;
 - (gg) outlet works;

- (hh) any other ancillary structures on or near the dam;
- (ii) a specified zone of a reservoir upstream of the dam wall between the left bank and right bank; and
- (jj) a specified zone of the river downstream of the dam between left bank and right bank;
- (ii) the provision of a floating safety boom upstream of the spillway, if applicable;
- (iii) the provision of safe access within designated areas of the dam wall or ancillary structures;
- (iv) if applicable, the provision of parapet walls, handrails, guard rails, fences or vehicle barriers;
- (v) the provision of appropriate warning signs at the dam wall and ancillary structures; and
- (vi) the provision of appropriate warning signs related to the use of the dam for recreational purposes, at or nearby the dam wall, if required by the Minister.

Emergency preparedness plan for dam with safety risk

- 99.** An emergency preparedness plan for a dam with a safety risk must include -
- (a) the names, addresses and contact particulars of -
 - (i) the owner and person in control of the dam;
 - (ii) the representative of the owner or person who has been granted authority to issue instructions in connection with the operation of the dam;
 - (iii) the person directly responsible for the day-to-day operation of the dam;
 - (iv) the person responsible for the taking of monitoring instrument readings at the dam;
 - (v) the person responsible for the regular evaluation of the monitoring instrument readings contemplated in subparagraph (iv);
 - (vi) the person responsible for routine inspections of the dam that must be carried out in accordance with the operation and maintenance manual;
 - (vii) the person in charge at the nearest office of -
 - (aa) the Regional Disaster Risk Management Committee contemplated in section 14 of the Disaster Risk Management Act;
 - (bb) the Constituency Disaster Risk Management Committee contemplated in section 15 of the Disaster Risk Management Act;

- (cc) the Local Authorities Disaster Risk Management Committee contemplated in section 16 of the Disaster Risk Management Act; and
- (dd) the Settlement Disaster Risk Management Committee contemplated in section 17 of the Disaster Risk Management Act, if any,

if applicable, with whom arrangements have been made in connection with the issuance of warnings and who is responsible for evacuation if a condition that affects the safety of the dam arises;

- (viii) the member in charge of the Namibian Police Force station nearest to the dam; and
 - (ix) representatives of local authorities, other representative bodies or of any communities potentially threatened by the presence of the dam and with whom arrangements have been made in connection with the issue of warnings if a condition that affects the safety of the dam arises;
- (b) detailed information describing the dam, its catchment area and downstream development, as well as -
- (i) basic flood hydrological data;
 - (ii) elevation versus capacity and elevation versus surface area curves for the dam;
 - (iii) spillway and outlet discharge tables or curves for the dam; and
 - (iv) a set of engineering drawings of the general layout of the dam and basic details of outlet works, sluices and spillway gates, if applicable;
- (c) descriptions of circumstances at the dam that should be considered a condition affecting the safety of the dam, together with guidelines for the evaluation of such a condition and procedures and actions to be followed;
- (d) a notification flowchart that shows who is to be notified, by whom, and in what priority, to enable timely notification of persons and organisations who are responsible for taking emergency actions;
- (e) a description of the responsibilities of the owner for developing, implementing, maintaining and updating the emergency preparedness plan;
- (f) a clear statement that the emergency preparedness plan is not an emergency evacuation plan, and -
- (i) if applicable, a statement which Disaster Risk Management Committee is responsible for warning and evacuation within affected areas; or
 - (ii) if no such Committee is responsible, the name, address and contact particulars of the person who will be responsible for the evacuation of people and animals;

- (g) a description of preparedness actions -
 - (i) to limit or alleviate the effects of a dam failure, operational spillway release or to deal with the effects of seismicity if this is considered to be reasonably necessary by the Minister or professional engineer; and
 - (ii) to facilitate response to emergencies;
- (h) identification of historical flood marks in built up areas; and
- (i) inundation maps delineating areas downstream of the dam that would be flooded as a result of a dam failure, and if considered to be reasonably necessary by the professional engineer, areas flooded by selected small, medium, large or major natural floods.

PART 11

CONTROL OF ACTIVITIES AFFECTING WETLANDS, WATER RESOURCES AND RESOURCE QUALITY

Application for licence for use of wetland or dam

- 100.** (1) A person who intends to -
- (a) use the products of a wetland or a dam for sale or commercial exploitation, excluding water and fish and the removal of rocks, sand or gravel from a watercourse, but including material, vegetation and animals from a wetland or dam;
 - (b) use a wetland or dam for commercial recreational purposes, including but not limited to tourism activities; or
 - (c) construct or erect any developments on the banks or in the riparian zone of any wetland or dam,

must make an application for a licence to do so to the Executive Director on a form approved by the Minister which form -

- (i) as a minimum requires the information set out in Annexure 17; and
 - (ii) is obtainable from the offices or official website of the Ministry.
- (2) An application referred to in subregulation (1) must be accompanied by -
- (a) a copy of the environmental plan and the environmental clearance certificate;
 - (b) a copy of the assessment report in respect of the proposed activities upon the environment, existing water resources and resource quality; and
 - (c) the application fee set out in item 14 of Annexure 20 or proof of payment of that fee.

Consideration of application for licence for use of wetland or dam

- 101.** (1) Upon receipt of an application contemplated in regulation 100 the Minister may -
- (a) require additional information from an applicant;

- (b) consult any institution, person or authority on the application, the assessment report concerned or any submission received in relation to the application; or
 - (c) refer the application to the basin management committee concerned or local authority council or regional council in whose area the wetland or dam is situated, for investigation and recommendations.
- (2) Upon receipt of an application referred to it in terms of subregulation (1)(c), a basin management committee, local authority council or regional council concerned must -
- (a) investigate all matters pertaining to the application;
 - (b) consider objections, if any;
 - (c) give the applicant an opportunity to make representations in support of his or her application in the case of any objection; and
 - (d) make recommendations to the Minister within 60 days after receipt of the application.
- (3) In deciding whether or not to grant an application for a licence for the use of a wetland or dam the Minister must consider -
- (a) whether the proposed use is consistent with the objects and fundamental principles contemplated in sections 2 and 3 of the Act;
 - (b) any recommendations made by the basin management committee, local authority council or regional council concerned;
 - (c) objections by interested persons, if any;
 - (d) representations made by the applicant, if any; and
 - (e) the assessment report concerned.
- (4) The Minister may -
- (a) grant an application for a licence for the use of a wetland or dam unconditionally;
 - (b) grant the application subject to any or all of the conditions contemplated in regulation 102; or
 - (c) refuse to grant the application.
- (5) If the Minister -
- (a) grants an application as contemplated in subregulation (4)(a) or (b) the Minister must, in writing, inform the applicant; or
 - (b) refuses to grant an application as contemplated in subregulation (4)(c) the Minister must, in writing, inform the applicant and provide reasons for the refusal of the application.

Conditions relating to licence for use of wetland or dam

102. Subject to regulation 101(4)(a) and (b), a licence for the use of a wetland or a dam is subject to the following conditions -

- (a) the holder of the licence must comply with the environmental plan and mitigation and rehabilitation matters contemplated in sections 2 and 3(2)(j) respectively, of the Environmental Management Act;
- (b) any activities relating to the use of a wetland or a dam may under no circumstances block or deflect the underground flow of water, the periodic visible run-off or floods in the watercourse;
- (c) activities relating to the use of a wetland or a dam are not permitted if there is a reasonable threat of pollution of groundwater or a body of water;
- (d) precautions to prevent damage to riverbanks or riparian zones and prevent pollution or reduction of water resource quality must be demonstrated;
- (e) excavations may not expose the roots of or destroy native trees in any watercourse;
- (f) the area where activities relating to the use of a wetland or a dam takes place must be left rehabilitated so that the view of the watercourse concerned is not blemished at any time;
- (g) the licence excludes the right of access to private properties and, if applicable, the holder of the licence must separately obtain permission from a particular landowner;
- (h) the Minister or his or her authorised representative has the right to carry out periodic inspections to determine whether these conditions are adhered to.

Licence for use of wetland or dam

103. If the Minister has granted an application for a licence for the use of a wetland or dam as contemplated in regulation 101(4)(a) or (b), the Minister must issue a licence for use of wetland or dam to the applicant in a form and manner specified in Annexure 28.

Duration of licence for use of wetland or dam

104. Unless sooner cancelled, a licence for the use of a wetland or a dam remains in force for the period, not exceeding three years, as determined by the Minister and specified in the licence.

Renewal of licence for use of wetland or dam

105. (1) The holder of a licence for the use of a wetland or a dam who intends to renew the licence must, within 90 days before the expiry of that licence make an application for renewal of the licence, to the Executive Director on a form approved by the Minister which form -

- (a) as a minimum requires the information set out in Annexure 17; and
- (b) is obtainable from the offices or official website of the Ministry.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 15 of Annexure 20 or proof of payment of that fee.

(3) Regulations 100, 101 and 102 apply with the necessary changes to an application contemplated in subregulation (1).

(4) In considering an application under subregulation (1) the Minister must -

- (a) have regard to the matters mentioned in regulation 101(3), as well as whether or to what extent the applicant has complied with the conditions applicable in respect of the expired licence; and
- (b) renew the licence unless, in the opinion of the Minister there are good reasons not to do so.

(5) In addition to additional conditions which the Minister may impose when renewing a licence, regulations 103 and 104 apply with the necessary changes to a licence which is renewed by the Minister.

Review and amendment of licence for use of wetland or dam

106. (1) The Minister may review, at any time during the duration of a licence issued for the use of a wetland or a dam, the licence and may amend the -

- (a) licence to the extent necessary to prevent or rectify any significant adverse effect in relation to any matter mentioned in regulation 101(3) caused or likely to be caused by an activity carried out under the licence; and
- (b) conditions applicable to the licence if it is in the public interest to do so or if the holder of the licence fails to comply with any condition.

(2) Before the Minister amends a licence as contemplated in subregulation (1), the Minister must -

- (a) give at least 30 days' written notice of the proposed amendment to the holder of the licence and specify in the notice the reasons for the amendment;
- (b) consider any representations submitted by the holder of the licence in relation to the proposed amendment; and
- (c) if the licence relates to a location within the water management area of a basin management committee or is situated within the area of a local authority council or a regional council, consider any recommendation made by the basin management committee, the local authority council or the regional council concerned in connection with the proposed amendment.

Suspension or cancellation of licence for use of wetland or dam

107. (1) Subject to subregulation (2), the Minister may suspend or cancel a licence issued for the use of a wetland or a dam if the holder of the licence -

- (a) fails to comply with a condition to which the licence is subject;
- (b) fails to comply with the Act or a directive, if any, given under the Act in connection with the licence;
- (c) fails to commence with operations under the licence within the period specified in the licence, if any; or

- (d) having commenced with the operations, discontinues operations under the licence.
- (2) The Minister may not suspend or cancel a licence as contemplated in subregulation (1) unless the Minister has -
 - (a) given written notice to the holder of the licence that the Minister proposes to suspend or cancel the licence and the reason for the proposed action;
 - (b) given the holder of the licence concerned the opportunity to make submissions to the Minister, within a reasonable specified period of not less than seven days, with respect to the proposed action; and
 - (c) taken into consideration the submissions made pursuant to paragraph (b), if any.
- (3) The Minister -
 - (a) must give written notice of the suspension or cancellation of a licence contemplated in subregulation (1) to the holder of the licence; and
 - (b) may, in a notice of suspension, state any conditions required to be complied with for the suspension to be lifted.
- (4) A suspension of a licence remains in force -
 - (a) for the period specified in the notice of suspension; or
 - (b) until the Minister in writing, notifies the holder of the licence that the suspension is lifted.
- (5) If the holder of a licence for the use of a wetland or a dam by notice in writing to the Minister surrenders the licence, the Minister must cancel the licence to be of effect as from the date of surrender specified in the notice.

Procedure upon expiry or cancellation of licence for use of wetland or dam

108. If a licence for the use of a wetland or a dam expires and is not renewed or is cancelled the Minister may -

- (a) require the holder of the licence, at the holder's expense, to remove any lien or other restriction preventing the free use of the wetland or the dam;
- (b) require the holder of the licence to take all reasonable steps to restore, at the holder's expense, the wetland or dam to a condition similar to the condition before the licence was granted, if doing so is practical in the circumstances; or
- (c) enter into an arrangement with the holder of the licence or any other person appointed by agreement with the holder, for maintenance of the wetland or dam.

Licence for use of wetland or dam not transferable

109. A licence for the use of a wetland or a dam or a right conferred by the licence is not transferable.

Prohibited use of wetland or dam

110. The following use of a wetland or a dam is considered to be harmful and is prohibited:

- (a) any permanent housing development along a river bank or dam or within a 100 metres distance from the river bank or dam;
- (b) any aquaculture farming in and within a distance of 100 metres from dams of strategic importance, including dams that are vulnerable to pollution;
- (c) any motorised water sport in dams of strategic importance, including dams that are vulnerable to pollution;
- (d) the storage of animal manure or other fertilizers in or near the watercourse or within a 100 metres distance from the active stream;
- (e) any wastewater storage along a watercourse or within a 100 metres distance from the active stream, and
- (f) the manufacturing of bricks along a watercourse or within a 100 metres distance from the active stream.

Offences and penalties relating to use of wetland or dam without licence

111. A -

- (a) person who uses a wetland or a dam as contemplated in paragraph (a), (b) or (c) of subregulation (1) of regulation 100 without a licence; or
- (b) holder of a licence to use a wetland or a dam who uses a wetland or a dam in contravention of any licence conditions,

commits an offence and is liable on conviction to a fine not exceeding N\$50 000 or to imprisonment for a period not exceeding two years or to both such fine and such imprisonment.

PART 12**REMOVAL OF ROCKS, SAND OR GRAVEL FROM WATERCOURSE FOR SALE
OR COMMERCIAL EXPLOITATION****Prohibition on removal of rocks, sand or gravel from watercourse for sale or commercial exploitation without licence**

112. Despite any other law in this regard, a person may not remove rocks, sand or gravel from a watercourse for sale or commercial exploitation unless the person is the holder of a licence issued under regulation 115 to do so.

Publication of intention to apply for licence

113. (1) A person who intends to apply for a licence to remove rocks, sand or gravel from a watercourse must publish, at least 60 days before he or she makes an application contemplated in regulation 114 to the Minister, a notice to that effect in the *Gazette* and a newspaper circulated widely in the area where the watercourse is located.

- (2) A notice published in terms of subregulation (1) must -
 - (a) contain the particulars and information contemplated in regulation 114(1)(a) to (f);
 - (b) invite the interested persons to lodge objections, if any, in writing; and
 - (c) state -
 - (i) the place at which, and the person to whom, objections must be lodged; and
 - (ii) the period within which objections are to be lodged, which period may not be less than 30 days from the date of publication of the notice in the *Gazette* and a newspaper circulated widely in the area where the watercourse is located.

Application for licence for removal of rocks, sand or gravel

114. (1) A person who intends to apply for a licence for removal of rocks, sand or gravel from a watercourse must apply to the Executive Director on a form approved by the Minister which form is obtainable from the offices or official website of the Ministry.

- (2) An application referred to in subregulation (1) must be accompanied by -
 - (a) proof of publication of the notice referred to in regulation 113 and all the objections received, if any;
 - (b) the application fee set out in item 16 of Annexure 20 or proof of payment of that fee; and
 - (c) an -
 - (i) environmental clearance certificate issued, to the applicant by the Environmental Commissioner, under regulation 13 of the Environmental Impact Assessment Regulations; or
 - (ii) environmental impact assessment report, contemplated in regulation 15 of the Environmental Impact Assessment Regulations,

in respect of the proposed removal of rocks, sand or gravel from a watercourse.

Consideration of application for licence for removal of rocks, sand or gravel

115. (1) Upon receipt of an application referred to in regulation 114(1), the Minister must refer the application to the basin management committee concerned, if any, for investigation and recommendations and the committee must -

- (a) investigate all matters pertaining to the application;
- (b) consider objections received, if any;
- (c) give the applicant an opportunity to make representations in support of his or her application in the case of any objection; and
- (d) make recommendations to the Minister.

(2) If there is no basin management committee concerned for the area in which the rocks, sand or gravel is to be removed or if the area is not situated within a basin the Minister must -

- (a) investigate all matters pertaining to the application;
 - (b) consider objections received, if any; and
 - (c) give the applicant an opportunity to make representations in support of his or her application in the case of any objection.
- (3) After considering -
- (a) any recommendations of the basin management committee, if applicable;
 - (b) the objections received, if any;
 - (c) the representations made by the applicant, if any;
 - (d) the environmental clearance certificate referred to in regulation 114(2)(c)(i), if any;
 - (e) the environmental impact assessment report referred to in regulation 114(2)(c)(ii), if any; and
 - (f) the compliance with the criteria referred to in regulation 116(2),

the Minister may -

- (i) grant the application for licence for removal of rocks, sand or gravel, with or without conditions; or
- (ii) refuse the application for licence for removal of rocks, sand or gravel, and inform the applicant, in writing, of the refusal.

Criteria upon which licence for removal of rocks, sand or gravel may be issued

116. (1) The Minister may only permit the removal of rocks, sand or gravel for sale or commercial exploitation if the removal does not endanger other development in the floodplains and on the riverbanks.

(2) In deciding whether an application under regulation 114 may be granted the Minister must consider -

- (a) whether the proposed removal of rocks, sand or gravel is consistent with -
 - (i) the objects and fundamental principles referred to in section 2 and 3 of the Act;
 - (ii) the objectives of the integrated water resources management plan; and
 - (iii) the conditions set out in subregulation (3); and
- (b) the likely effect of the proposed removal of rocks, sand or gravel on -
 - (i) the riparian vegetation;

- (ii) the quality of any water resource; and
- (iii) aquatic ecosystems dependent on the resource.

(3) If approval is granted as contemplated in regulation 115(3) the Minister may impose the following conditions -

- (a) if not yet submitted, an environmental plan, which must include mitigation and rehabilitation matters contemplated in sections 2 and 3(2)(j) respectively, of the Environmental Management Act, must be submitted to the Minister prior to the initiation of any rocks, sand or gravel removal activities;
- (b) the removal of rocks, sand or gravel may not take place within 200 metres upstream or downstream from any developed river bank areas or properties;
- (c) the removal of rocks, sand or gravel from any watercourse may not take place within 200 metres upstream and downstream from any bridge;
- (d) rocks, sand or gravel may not be removed from a watercourse prior to the establishment of markers to indicate the original depth and width in the case of a river and its banks in order to enable the Minister to monitor the depth of removal;
- (e) the removal of rocks, sand or gravel must be terminated two metres above the groundwater table;
- (f) the normal underground flow of water in the watercourse as well as the periodic visible run-off and floods may under no circumstances be polluted, blocked or deflected;
- (g) precautions must be taken to prevent damage to the riverbanks during the removal of rocks, sand or gravel;
- (h) the removal may not expose the roots of the vegetation in any watercourse, especially native woody species; and
- (i) the area where the removal of rocks, sand or gravel takes place must be rehabilitated so that the view of the watercourse is not blemished at any time.

(4) The granting of an application referred to in regulation 115(3) excludes the right of access to private properties, and if applicable, permission must separately be obtained from the particular landowner by the holder of the licence.

(5) The Minister or his or her authorised representative may carry out periodic inspections to determine whether the conditions imposed under the licence are adhered to.

Licence for removal of rocks, sand or gravel

117. (1) If an application has been granted as contemplated in regulation 115(3)(i), the Minister must issue to the applicant a licence for the removal of rocks, sand or gravel in the form and manner specified in Annexure 23.

(2) A licence issued under subregulation (1) expires after three years from the date of issue and is subject to regulation 119.

Terms and conditions of licence for removal of rocks, sand or gravel

- 118.** A licence issued under regulation 117 is issued subject to -
- (a) the achievement of the objectives of the integrated water resources management plan;
 - (b) the protection of the environment and the watercourse in which the removal of rocks, sand or gravel will occur by -
 - (i) setting out the specific amount of sand which may be removed;
 - (ii) specifying the location of the sand removal;
 - (iii) specifying locations where a watercourse may be impounded and where water would be stored; and
 - (c) the accommodation of reasonable requirements by any traditional community contemplated in section 1 of the Traditional Authorities Act, 2000 (Act No. 25 of 2000).

Renewal of licence for removal of rocks, sand or gravel

119. (1) The holder of a licence for removal of rocks, sand or gravel who intends to renew that licence must make an application to the Minister, in the manner contemplated in regulation 114 and within 90 days before the expiry of that licence, for the renewal of that licence.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 16 of Annexure 20 or proof of payment of that fee.

(3) Regulations 114 to 118 apply with the necessary changes to an application contemplated in subregulation (1).

(4) In addition, the applicant concerned must together with the application concerned submit particulars of -

- (a) the viability of the rocks, sand or gravel removal project;
- (b) any changes in groundwater water quality over time; and
- (c) any environmental changes, either positive or negative.

(5) In considering an application for renewal referred to in subregulation (1) the Minister must have regard to whether or to what extent the applicant has complied with any conditions of the existing licence.

Review, amendment, suspension or cancellation of licence for removal of rocks, sand or gravel

120. (1) Subject to subregulation (3), the Minister at any time during the term of duration of a licence issued under regulation 117 may review the licence and, pursuant to the review -

- (a) amend the terms or conditions of the licence; or

- (b) suspend or cancel the licence,

if it is in the public interest to do so.

(2) Subject to subregulation (3), the Minister may suspend or cancel a licence issued under regulation 117 in whole or in part, if the holder of the licence -

- (a) contravenes or fails to comply with any of the terms or conditions of the licence;
- (b) fails to commence with the removal of rocks, sand or gravel within the period specified in the terms and conditions of the licence; or
- (c) having commenced with the removal of rocks, sand or gravel ceases the removal for a continuous period of three years.

(3) Before the Minister amends, suspends or cancels any licence under subregulation (1) or (2) the Minister must afford the holder of the licence an opportunity to make representations in respect of the proposed amendment, suspension or cancellation.

Effect of expiry or cancellation of licence for removal of rocks, sand or gravel

121. If a licence for the removal of rocks, sand or gravel from a watercourse expires and is not renewed or is cancelled the Minister may -

- (a) require the holder of the licence to remove any lien or other restriction preventing the free use of the removal works;
- (b) order the holder to restore the state of affairs which existed before a licence was issued, if doing so is reasonable and practicable under the circumstances; or
- (c) enter into an arrangement with the holder of the licence or any other person for maintenance of the removal works.

Licence for removal of rocks, sand or gravel not transferable

122. A licence issued under regulation 117 is not transferable by way of lease, sale alienation, succession or otherwise.

Offences and penalties relating to removal of rocks, sand or gravel without licence or in contravention of licence conditions

123. Any -

- (a) person who removes rocks, sand or gravel from a watercourse for sale or commercial exploitation without a licence commits an offence and is liable on conviction to a fine not exceeding N\$100 000 or to imprisonment for a period not exceeding two years or to both such fine and such imprisonment;
- (b) holder of a licence issued under regulation 117 who removes rocks, sand or gravel from a watercourse for sale or commercial exploitation in contravention of any licence conditions commits an offence and is liable on conviction to a fine not exceeding N\$50 000 or to imprisonment for a period not exceeding two years or to both such fine and such imprisonment.

PART 13

CONTROL OF AQUATIC INVASIVE SPECIES

Declaration of certain species to be alien invasive species

- 124.** For purposes of section 102 of the Act the -
- (a) aquatic plant species specified in Columns 2 and 3 of Annexure 13 are prohibited alien invasive species, as mentioned in Column 4 of that Annexure;
 - (b) aquatic animal species specified in Columns 2 and 3 of Annexure 14 are restricted alien invasive species as mentioned in Column 4 of that Annexure.

Prohibition of importation, transport and spreading of prohibited alien invasive species

125. A person may not import into Namibia or transport or spread in Namibia any prohibited alien invasive species referred to in Annexure 13.

Application for licence to import, transport or spread restricted alien invasive species

126. (1) A person who intends to import, transport or spread restricted alien invasive species must make an application for approval to do so to the Executive Director on a form which -

- (a) as a minimum requires the information set out in Annexure 18; and
- (b) is obtainable from the offices or official website of the Ministry.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 17 of Annexure 20 or proof of payment of that fee.

Consideration of application for licence to import, transport or spread restricted alien invasive species

127. (1) Upon receipt of an application form referred to in regulation 126 the Minister may -

- (a) require additional information from an applicant;
- (b) consult any institution, person or authority on the application or any submission received in relation to the application; and
- (c) refer the application to the basin management committee concerned or local authority council or regional council in whose area the restricted alien invasive species are to be introduced for investigation and recommendations.

(2) Upon receipt of an application referred to it in terms of subregulation (1)(c), a basin management committee, local authority council or regional council must -

- (a) investigate all matters pertaining to the application;
- (b) consider objections, if any;

- (c) give the applicant an opportunity to make representations in support of his or her application in the case of any objection; and
 - (d) make recommendations to the Minister within 60 days after receipt of the application.
- (3) In deciding whether an application for a licence to import, transport or spread restricted alien invasive species should be granted, the Minister must consider -
- (a) whether the proposed uses are consistent with the objects and fundamental principles contemplated in sections 2 and 3 of the Act;
 - (b) any recommendations made by the basin management committee, local authority council or regional council concerned;
 - (c) objections by interested persons, if any; and
 - (d) representations made by the applicant, if any.
- (4) The Minister may -
- (a) grant an application for a licence to import, transport or spread restricted alien invasive species unconditionally;
 - (b) grant the application subject to any or all of the conditions contemplated in regulation 128; or
 - (c) refuse to grant the application.
- (5) If the Minister -
- (a) grants an application as contemplated in subregulation (4)(a) or (b), the Minister must in writing, inform the applicant; or
 - (b) refuses to grant an application as contemplated in subregulation (4)(c), the Minister must in writing, inform the applicant and provide reasons for the refusal of the application.

Conditions relating to licence to import, transport or spread restricted alien invasive species

128. Subject to regulation 127(4)(a) and (b), a licence to import, transport or spread restricted alien invasive species is subject to the following conditions:

- (a) no introduction of restricted alien invasive species is permitted if there is a reasonable threat to the ecological integrity of any body of water;
- (b) precautions to prevent reduction of water resource quality must be demonstrated;
- (c) the licence excludes the right of access to private properties and, if applicable, the holder of the licence must separately obtain permission from a particular landowner; and
- (d) the Minister or his or her authorised representative has the right to carry out periodic inspections to determine whether these conditions are adhered to.

Licence to import, transport or spread restricted alien invasive species

129. If the Minister has granted an application for the licence to import, transport or spread restricted alien invasive species as contemplated in regulation 127(4)(a) or (b), the Minister must issue to the relevant applicant a licence contemplated Annexure 24.

Duration of licence to import, transport or spread restricted alien invasive species

130. Unless sooner cancelled, a licence to import, transport or spread restricted alien invasive species remains in force for the period, not exceeding three years, as determined by the Minister and specified in the licence.

Renewal of licence to import, transport or spread restricted alien invasive species

131. (1) The holder of a licence to import, transport or spread restricted alien invasive species who intends to renew the licence may apply to the Minister in the manner and form contemplated in regulation 126 and within 90 days before the expiry of that licence, for the renewal of that licence.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 18 of Annexure 20 or proof of payment of that fee.

(3) Regulations 126, 127 and 128 apply with the necessary changes to an application contemplated in subregulation (1).

(4) In considering an application contemplated in subregulation (1) the Minister must have regard to the matters mentioned in regulation 127(3) as well as whether or to what extent the applicant has complied with the conditions applicable in respect of the existing licence.

(5) After considering an application contemplated in subregulation (1) the Minister must renew the licence unless, in the opinion of the Minister there are good reasons not to do so.

(6) In addition to additional conditions which the Minister may impose when renewing a licence, regulations 129 and 130 apply with the necessary changes to a licence which is renewed by the Minister.

Review and amendment of licence to import, transport or spread restricted alien invasive species

132. (1) The Minister may, at any time during the duration of a licence issued to import, transport or spread restricted alien invasive species, review the licence and may amend -

- (a) the licence to the extent necessary to prevent or rectify any significant adverse effect in relation to any matter mentioned in regulation 127(3) caused or likely to be caused by an activity carried out under the licence; or
- (b) the conditions applicable to the licence if it is in the public interest to do so or if the holder of the licence fails to comply with any condition.

(2) Before the Minister amends a licence as contemplated in subregulation (1) the Minister must -

- (a) give at least 30 days' written notice of the proposed amendment to the holder of the licence and specify in the notice the reasons for the amendment;

- (b) consider any representations submitted by the holder of the licence in relation to the proposed amendment; and
- (c) if the licence relates to a location within the water management area of a basin management committee or an area of a local authority council or a regional council, consider any recommendation made by the basin management committee, the local authority council or the regional council concerned, in connection with the proposed amendment.

Suspension or cancellation of licence to import, transport or spread restricted alien invasive species

133. (1) Subject to subregulation (2), the Minister may suspend or cancel a licence issued to import, transport or spread restricted alien invasive species if the holder of the licence -

- (a) fails to comply with a condition to which the licence is subject;
- (b) fails to comply with the Act or a directive, if any, given under the Act in connection with the licence;
- (c) fails to commence with operations under the licence within the period specified in the licence, if any; or
- (d) having commenced with the operations, discontinues operations under the licence for 90 days or more.

(2) The Minister may not suspend or cancel a licence as contemplated in subregulation (1) unless the Minister -

- (a) has given written notice to the holder of the licence that the Minister proposes to suspend or cancel the licence and the reason for the proposed action;
- (b) has given the holder of the licence concerned the opportunity to make submissions to the Minister, within a reasonable specified period of not less than seven days, with respect to the proposed action; and
- (c) has taken any submissions made under paragraph (b) into consideration.

(3) The Minister -

- (a) must give written notice of the suspension or cancellation of a licence contemplated in subregulation (1) to the holder of the licence; and
- (b) may, in a notice of suspension, state any conditions required to be complied with for the suspension to be lifted.

(4) A suspension of a licence remains in force -

- (a) for the period specified in the notice of suspension; or
- (b) until the Minister, in writing, notifies the holder of the licence that the suspension is lifted.

(5) If the holder of a licence to import, transport or spread restricted alien invasive species by notice in writing to the Minister surrenders the licence, the Minister must cancel the licence to be of effect as from the date of surrender specified in the notice.

Procedure upon expiry or cancellation of licence to import, transport or spread restricted alien invasive species

134. If a licence to import, transport or spread restricted alien invasive species expires and is not renewed or is cancelled the Minister may -

- (a) require the holder of the licence, at the holder's expense, to remove any lien or other restriction preventing the importation, transport or spread of the restrictive alien invasive species;
- (b) require the holder of the licence to take reasonable steps to restore, at the holder's expense, the state of affairs which existed before the licence was granted, if doing so is practical in the circumstances; or
- (c) enter into an arrangement with the holder of the licence or any other person appointed by agreement with the holder for maintenance of the resources.

Licence to import, transport or spread restricted alien invasive species not transferable

135. A licence to import, transport or spread restricted alien invasive species or a right conferred by the licence is not transferable.

Offences and penalties relating to prohibited or restricted alien species

136. (1) A person who imports into Namibia or transports or spreads in Namibia any -

- (a) prohibited alien invasive species;
- (b) restricted alien invasive species without a licence;

commits an offence and is liable on conviction to a fine not exceeding N\$100 000 or to imprisonment for a period not exceeding two years or to both such fine and such imprisonment.

(2) A holder of a licence who imports into Namibia or transports or spreads in Namibia any restricted alien invasive species in contravention of any licence conditions commits an offence and is liable on conviction to a fine not exceeding N\$50 000 or to imprisonment for a period not exceeding two years or to both such fine and such imprisonment.

PART 14**PROTECTION OF RIPARIAN ZONES****Definition of "riparian species" and "riparian zone"**

137. For the purposes of regulations 138 to 149, inclusive -

"riparian species" means any vegetation or plant whose occurrence or density follows the line of the watercourse of a riparian zone.

"riparian zone" means the historically, occasionally or seasonally flooded banks and floodplains along both sides of a watercourse;

Prohibition on removal of riparian species, filling or excavation of riparian zone or erection of structural development within riparian zone without licence

- 138.** A person may not -
- (a) remove any riparian species;
 - (b) fill or excavate a riparian zone; or
 - (c) erect any structural development within a riparian zone,

without a licence issued by the Minister.

Application for licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone

139. (1) A person who intends to apply for a licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone must make an application for a licence to do so to the Executive Director on a form which -

- (a) as a minimum requires the information set out in Annexure 19; and
 - (b) is obtainable from the offices or official website of the Ministry.
- (2) An application referred to in subregulation (1) must be accompanied by -
- (a) a copy of the environmental plan, from the Ministry responsible for environment, contemplated in Part VI or sections 23 to 26 of the Environmental Management Act;
 - (b) a copy of the -
 - (i) environmental clearance certificate issued, to the applicant by the Environmental Commissioner, under paragraph (a) of subsection (1) of -
 - (aa) section 34 of the Act; or
 - (bb) section 37 of the Act; or
 - (ii) environmental impact assessment report, contemplated in regulation 15 of the Environmental Impact Assessment Regulations,

in respect of the proposed removal of riparian species, the filling or excavation of a riparian zone or erection of a structural development within a riparian zone; and

- (c) the application fee set out in item 19 of Annexure 20 or proof of payment of that fee.

Consideration of application for licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone

140. (1) On receipt of an application form referred to in regulation 139 the Minister may -

- (a) require additional information from an applicant;

- (b) consult any institution, person or authority on the application, the assessment report concerned or any submission received in relation to the application;
 - (c) refer the application to the basin management committee concerned or the local authority council or regional council in whose area the watercourse and riparian zone are situated for investigation and recommendations.
- (2) On receipt of an application referred to it in terms of subregulation (1)(c), a basin management committee, local authority council or regional council concerned -
- (a) investigate all matters pertaining to the application;
 - (b) consider objections, if any;
 - (c) give the applicant an opportunity to make representations in support of his or her application in the case of any objection; and
 - (d) make recommendations to the Minister within 60 days after receipt of the application.
- (3) In deciding whether an application for a licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone should be granted the Minister must consider -
- (a) whether the proposed activities referred to in regulation 138(a), (b) or (c) are consistent with the objects and fundamental principles contemplated in sections 2 and 3 of the Act;
 - (b) any recommendations made by the basin management committee, local authority council or regional council concerned;
 - (c) objections by interested persons, if any;
 - (d) representations made by the applicant, if any; and
 - (e) the environmental impact assessment report referred to in regulation 139(2)(ii).
- (4) The Minister may -
- (a) grant an application for a licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone unconditionally;
 - (b) grant the application subject to any or all of the conditions contemplated in regulation 141; or
 - (c) refuse to grant the application.
- (5) If the Minister -
- (a) grants an application as contemplated in subregulation (4)(a) or (b), the Minister must in writing, inform the applicant; or
 - (b) refuses to grant an application as contemplated in subregulation (4)(c), the Minister must in writing, inform the applicant and provide reasons for the refusal of the application.

Conditions relating to licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone

141. Subject to regulation 140(4)(a) and (b), a licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone is subject to the following conditions:

- (a) where there is a reasonable threat to the ecological integrity of any body of water a person may not -
 - (i) remove riparian species from the riparian zone of that body of water;
 - (ii) excavate or fill the riparian zone of the body of water; or
 - (iii) erect any structural development within the riparian zone the body of water;
- (b) a person may not remove a protected plant species;
- (c) a person may not erect any structural development on the stream or river bank;
- (d) a buffer zone of 100 metres from the stream or river bank must be maintained to protect streams and river banks from soil erosion and reduces flooding;
- (e) a person may not remove rocks, sand or gravel within 100 metres of the riparian zone from the stream or river bank;
- (f) a licence holder who removes rocks, sand or gravel must ensure that such removal does not expose the roots of indigenous trees in any watercourse;
- (g) precautionary measures to prevent damage to riverbanks or riparian zones and prevent the pollution or reduction of water resource quality must be implemented by the licensee;
- (h) the licence excludes the right of access to private properties, and if applicable, the holder of the licence must separately obtain permission from a particular landowner; and
- (i) the Minister or his or her authorised representative reserves the right to carry out periodic inspections to determine whether the conditions of the licence are adhered to.

Licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone

142. (1) If the Minister grants an application to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone as contemplated in regulation 140(4)(a) or (b), the Minister must issue to the applicant a licence contemplated in Annexure 29.

(2) The licence referred to in subregulation (1) is valid for a period of three years and is renewable.

Duration of licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone

143. Unless sooner cancelled, a licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone remains in force for the period, not exceeding three years, as determined by the Minister and specified in the licence.

Renewal of licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone

144. (1) The holder of a licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone who intends to renew the licence must, within 90 days before the expiry of that licence, make an application for the renewal of the licence to the Executive Director on a form which -

- (a) as a minimum requires the information set out in Annexure 19; and
- (b) is obtainable from the offices or official website of the Ministry.

(2) An application referred to in subregulation (1) must be accompanied by the application fee set out in item 20 of Annexure 20 or proof of payment of that fee.

(3) Regulations 127, 139 and 141 apply with the necessary changes to an application contemplated in subregulation (1).

(4) In considering an application referred to in subregulation (1) the Minister must -

- (a) have regard to the matters mentioned in regulation 140(3), as well as whether or to what extent the applicant has complied with the conditions applicable in respect of the existing licence; and
- (b) renew the licence unless in the opinion of the Minister there are good reasons not to do so.

(5) In addition to additional conditions which the Minister may impose when renewing a licence, regulations 142 and 143 apply with the necessary changes to a licence which is renewed by the Minister.

Review and amendment of licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone

145. (1) The Minister may, at any time during the duration of a licence issued to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone, review the licence and may amend -

- (a) the licence to the extent necessary to prevent or rectify any significant adverse effect in relation to any matter mentioned in regulation 140(3) caused or likely to be caused by an activity carried out under the licence;
- (b) the conditions applicable to the licence if it is in the public interest to do so or if the holder of the licence fails to comply with any condition.

(2) Before the Minister amends a licence as contemplated in subregulation (1), the Minister must -

- (a) give at least 30 days' written notice of the proposed amendment to the holder of the licence and specify in the notice the reasons for the amendment;
- (b) consider any representations submitted by the holder of the licence in relation to the proposed amendment; and
- (c) if the licence relates to a location within the water management area of a basin management committee or is situated within the area of a local authority council or a regional council, consider any recommendation made by the basin management committee, the local authority council or the regional council concerned, in connection with the proposed amendment.

Suspension or cancellation of licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone

146. (1) Subject to subregulation (2), the Minister may suspend or cancel a licence issued to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone if the holder of the licence -

- (a) fails to comply with a condition to which the licence is subject;
- (b) fails to comply with the Act or a directive, if any, given under the Act in connection with the licence;
- (c) fails to commence with operations under the licence within the period specified in the licence, if any; or
- (d) having commenced with operations, discontinues operations under the licence.

(2) The Minister may not suspend or cancel a licence as contemplated in subregulation (1) unless the Minister -

- (a) has given written notice to the holder of the licence that the Minister proposes to suspend or cancel the licence and the reason for the proposed action;
- (b) has given the holder of the licence concerned the opportunity to make submissions to the Minister, within a reasonable specified period of not less than seven days, with respect to the proposed action; and
- (c) has taken any submissions made under paragraph (b) into consideration.

(3) The Minister -

- (a) must give written notice of the suspension or cancellation of a licence contemplated in subregulation (1) to the holder of the licence; and
- (b) may, in a notice of suspension, state any conditions required to be complied with for the suspension to be lifted.

- (4) A suspension of a licence remains in force -
- (a) for the period specified in the notice of suspension; or
 - (b) until the Minister, in writing, notifies the holder of the licence that the suspension is lifted.

(5) If the holder of a licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone by notice in writing to the Minister surrenders the licence, the Minister must cancel the licence to be of effect as from the date of surrender specified in the notice.

Procedure upon expiry or cancellation of licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone

147. If a licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone expires and is not renewed or is cancelled the Minister may -

- (a) require the holder of the licence, at the holder's expense, to remove any lien or other restriction preventing the removal of riparian species, the filling or excavation of a riparian zone or the erection of a structural development within a riparian zone;
- (b) require the holder of the licence to take all reasonable steps to restore, at the holder's expense, the state of affairs which existed before the licence was granted, if doing so is practical in the circumstances; or
- (c) enter into an arrangement with the holder of the licence or any other person appointed by agreement with the holder, for the rehabilitation of the riparian zone.

Licence to remove riparian species, fill or excavate riparian zone or erect structural development within riparian zone not transferable

148. A licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone or a right conferred by the licence is not transferable.

Offences and penalties relating to removal of riparian species, filling or excavation of riparian zone or erection of structural development within riparian zone

149. Any -

- (a) person who undertakes any activity referred to in regulation 138(a), (b) or (c), without a licence commits an offence and is liable on conviction to a fine not exceeding N\$100 000 or to imprisonment for a period not exceeding two years or to both such fine and such imprisonment;
- (b) holder of a licence who acts in contravention of any licence conditions commits an offence and is liable on conviction to a fine not exceeding N\$50 000 or to imprisonment for a period not exceeding two years or to both such fine and such imprisonment.

PART 15

WATER SERVICES PROVIDED BY STATE

Penalty fee leviable and recoverable against user in default of payment of fees and charges owing to State

150. (1) Any user who fails to pay any fees and charges owing to the State in respect of services referred to in section 104(1) of the Act on or before the due date for payment is liable, in addition to the payment owing to the State, for the payment of a penalty fee equal to 10% of the amount of unpaid fees and charges for each month or part thereof reckoned from the first day after the due date to the date of payment of the unpaid amount.

(2) A penalty fee paid by a person under subregulation (1) must be refunded to the person if for any reason the fees and charges to which the penalty fee relates is subsequently determined not to have been due and payable.

ANNEXURE 1

(Regulations 4, 6 and 37)

WATER QUALITY GUIDELINES AND STANDARDS FOR POTABLE WATER**Table 1.1: Chemical and Biological Requirements**

Specifications for water quality intended for human consumption from the source and piped water supply					
Status				Ranges and upper limits	
Interpretation				(Ideal guideline)	(Acceptable Standard)
DETERMINANTS	Unit	Format	Concern	95 Percentile Requirement	
PHYSICAL AND ORGANOLEPTIC REQUIREMENTS					
Temperature	° C		E	Ambient temperature	
Colour	PTU	or mg/ litre	E	10	<15
Taste			O,E	No objectionable taste	
Odour			O,E	No objectionable odour	
Turbidity (treated surface water)	NTU	or TU	H,I	< 0.3	< 0.5
Turbidity (groundwater)	NTU	or TU	H,I	< 0,5	<2
pH @ 20 °C	pH		I	6.0 to 8.5	6 to 9
Electric Conductivity @ 25 °C	mS/m***	E.C.	H,I	< 80	< 300
Total Dissolved Solids (treated surface water)	mg/litre		H,I	< 500	< 2 000
Total Dissolved Solids (groundwater)	mg/litre		H,I	< 1000	< 2 000

Specifications for water quality intended for human consumption from the source and piped water supply					
Status				Ranges and upper limits	
Interpretation				(Ideal guideline)	(Acceptable Standard)
DETERMINANTS	Unit	Format	Concern	95 Percentile Requirement	
INORGANIC MACRO DETERMINANTS					
Ammonia	mg/litre	N	H	< 0.2	< 0.5
Barium	mg/litre	Ba	H	0.5	< 2
Calcium	mg/litre	Ca	I	< 80	< 150
Chloride	mg/litre	Cl	H,I	< 100	< 300
Fluoride	mg/litre	F	H	< 0.7	< 1.5
Magnesium	mg/litre	Mg	H	< 30	< 70
Nitrate	mg/litre	N	H	< 6	< 11
Nitrite	mg/litre	N	H	< 0.1	< 0.15
Potassium	mg/litre	K	H	< 25	< 100
Sodium	mg/litre	Na	H,I	< 100	< 300
Sulphate	mg/litre	SO₄	H,O	100	< 300
Asbestos (fibres longer than 10 mm)	Fibres/ litre		H	<500 000	< 1000 000
INORGANIC MICRO DETERMINANTS					
Aluminium	µg/litre	Al	H	< 25	< 100
Antimony	µg/litre	Sb	H	< 5	< 50
Arsenic	µg/litre	As	H	<10	< 50
Beryllium	µg/litre	Be	H	< 2	< 5
Bismuth	µg/litre	Bi	H	< 250	< 500
Boron	µg/litre	B	H	<300	<500
Bromide	µg/litre	Br	H	< 500	< 1 000
Cadmium	µg/litre	Cd	H	< 5	< 10
Cerium	µg/litre	Ce	H	<1 000	<2 000
Cesium	µg/litre	Cs	H	< 1 000	< 2 000
Chromium Total	µg/litre	Cr	H	< 50	< 100
Cobalt	µg/litre	Co	H	< 250	< 500
Copper	µg/litre	Cu	H	< 500	< 2 000
Radon	Bq/litre	Ra		< 200	< 1 000

Specifications for water quality intended for human consumption from the source and piped water supply					
Status				Ranges and upper limits	
Interpretation				(Ideal guideline)	(Acceptable Standard)
DETERMINANTS	Unit	Format	Concern	95 Percentile Requirement	
INORGANIC MICRO DETERMINANTS					
Cyanide (free)	µg/litre	CN ⁻	H	< 20	< 50
Cyanide (recoverable)	µg/litre	CN ⁻	H	< 70	< 200
Iron	µg/litre	Fe	H,E	< 200	< 300
Lead	µg/litre	Pb	H	<10	< 50
Manganese	µg/litre	Mn	H	< 50	< 100
Mercury	µg/litre	Hg	H	< 1	<2
Nickel	µg/litre	Ni	H	< 50	< 150
Selenium	µg/litre	Se	H	< 10	< 50
Thallium	µg/litre	Tl	H	< 5	< 10
Tin	µg/litre	Sn	H	<100	<200
Titanium	µg/litre	Ti	H	< 100	< 300
Uranium	µg/litre	U	H	< 3	< 15
Vanadium	µg/litre	V	H	< 100	< 500
Zinc	µg/litre	Zn	H	< 1 000	< 5 000
Organo-metallic compounds (as organo or industrial chemicals or others)	µg/litre	Polymer	H	below detection limit (in accordance with WHO and EPA requirements)	below detection limit (in accordance with WHO and EPA requirements)
ORGANIC DETERMINANTS					
Dissolved Organic Carbon	mg/litre	DOC-C	H	< 5	<10
Phenol compounds	µg/litre	Phenol	H	< 5	< 10
DISINFECTION AND DISINFECTION BY-PRODUCTS					
Bromodichloro-methane (Part of THM)	µg/litre		H	< 20	< 50
Bromoform (Part of THM)	µg/litre		H	< 40	< 40
Chloroform (Part of THM)	µg/litre		H	< 20	< 100
Dibromomonochloro-methane (Part of THM)	µg/litre		H	< 20	< 100
Trihalomethanes (Total)	µg/litre	THM	H	< 100	< 150
Bromate	µg/litre		H	< 5	< 10
Chloramines	µg/litre	Cl ₂	H	< 2	< 4

Specifications for water quality intended for human consumption from the source and piped water supply					
Status				Ranges and upper limits	
Interpretation				(Ideal guideline)	(Acceptable Standard)
DETERMINANTS	Unit	Format	Concern	95 Percentile Requirement	
INORGANIC MICRO DETERMINANTS					
Cyanide (free)	µg/litre	CN ⁻	H	< 20	< 50
Cyanide (recoverable)	µg/litre	CN ⁻	H	< 70	< 200
Iron	µg/litre	Fe	H,E	< 200	< 300
Chlorine dioxide after 30 min; GENERAL	µg/litre		H	200 - 500	< 800
Chlorine dioxide after 30 min; SPECIFIC	µg/litre		Turbid- ity> 0.3 NTU	200	200 - 400
Chlorine dioxide after 60 min; SPECIFIC	µg/litre		Turbid- ity> 1.0 NTU	< 200	200 - 500
Chlorite	µg/litre		H	< 400	< 800
Chlorate	µg/litre		H	< 200	< 700
Haloacetic acids	µg/litre		H	not detected	< 60
Chlorine, free, after 30 min; GENERAL	mg/litre	Cl ₂	H,I	0.3 – 0.5	0.1 – 1.5
Chlorine, free, after 30 min; SPECIFIC	mg/litre	Cl ₂	Turbid- ity: < 0.3 NTU	0.3	0.1 – 1.5
Chlorine, free, after 30 min; SPECIFIC	mg/litre	Cl ₂	Turbid- ity: > 0.3 NTU	0.5	0.1 – 1.5
Chlorine, free, after 60 min; SPECIFIC	mg/litre	Cl ₂	Turbid- ity: >1.0 NTU	1.0	0.1 – 1.5
Specifications for water quality intended for human consumption from the source and piped water supply					
Status				Ranges and upper limits	
Interpretation				(Ideal guideline)	(Acceptable Standard)
DETERMINANTS	Unit	Format	Concern	95 Percentile Requirement	
BIOLOGICAL REQUIREMENTS					
Algae					
Chlorophyll α	µg/litre		E,O	< 1	< 2
Total algae cell count		/ml	H,O	< 200	<5 000
Blue-green algae	Cells	/ml	H,O	< 200	<2 000
Mycrocystin	µg/litre		H	< 0.1	< 1

Specifications for water quality intended for human consumption from the source and piped water supply					
Status				Ranges and upper limits	
Interpretation				(Ideal guideline)	(Acceptable Standard)
DETERMINANTS	Unit	Format	Concern	95 Percentile Requirement	
INORGANIC MICRO DETERMINANTS					
Cyanide (free)	µg/litre	CN ⁻	H	< 20	< 50
Cyanide (recoverable)	µg/litre	CN ⁻	H	< 70	< 200
Iron	µg/litre	Fe	H,E	< 200	< 300
Geosmin	ng/litre		E, H	< 15	< 30
2-Methyl Iso Borneal (2 MIB)	ng/litre		E, H	< 15	< 30
OTHER DETERMINANTS					
Agricultural chemical compounds			H	Any organic compound recognized as an agro-chemical must be in accordance with the WHO and EPA requirements.	
Industrial chemical compounds			H	Any organic compound recognized as an industrial chemical must be in accordance with the WHO and EPA requirements.	
Endocrine disruptive chemicals			H	Any chemical compound that is suspected of having endocrine disruptive effects must be in accordance with the WHO and EPA requirements.	
RADIOACTIVITY				95 Percentile Requirement	
Gross alpha activity	Bq/litre		H	< 0.2	< 0.5
Gross beta activity	Bq/litre		H	< 0.4	< 1.0
If Gross alpha and beta is above specification calculate Dose based on individual radionuclide concentrations	mSv/a		H	≤ 0.04	≤ 0.1

“Concern” refers to impact if the limit is transgressed: H = health concern; O = organoleptic effect;

I = effect on infrastructure, structural; E = aesthetic effect

* Based on a viral cell culture-dependent method and not on cell culture-independent methods (e.g. PCR)

** Indicative of faecal pollution having occurred, even when the residual disinfectant levels are safe.

*** Comply with SANAS Guidelines

Table 1.2: Standards for Microbiological and Biological Requirements

MICROBIOLOGICAL REQUIREMENTS APPLICABLE TO ALL POTABLE WATER					
Microbiology	Cfu			95 percentile	1 of samples maximum
Heterotrophic bacteria HPC or TCC	Counts	/ml		100	1 000
Total Coliform	Counts	/100 ml	H	0	5
E.Coli	Counts	/100 ml	H	0	1
Enterococci	Counts	/100 ml	H	0	1
Somatic Coliphage	Counts	/100 ml	H	0	1
Clostridium perfringens inclusive spores	Counts	/100 ml	H	0	1
Enteric viruses	viral count*	/10 L	H	0	1
Parasites (Protozoa) applicable to all potable water				95 percentile	99 percentile
Giardia lamblia	Cysts	/100 litre	H	0	1
Cryptosporidium	Oocysts	/100 litre	H	0	1
Giardia lamblia and Giardia lamblia (Grab sample)	cysts or oocysts	/10 L	H	0	0

Table 1.3: Special Requirements for the Protection of Infrastructure

Specifications for water quality intended for human consumption from the source and piped water supply for the protection of infrastructure against corrosion					
Status				Ranges and upper limits	
Interpretation				(Ideal guideline)	(Acceptable Standard)
DETERMINANTS	Unit	Format	Concern	95 Percentile requirement	
CORROSIVE AND SCALING PROPERTIES (treated surface water)					
Calcium Carbonate Precipitation Potential	mg/litre	CCPP	I	4 - 5	1 - 6
Alkalinity/Sulphate/Chloride Ratio	Equivalents	Corrosivity Ratio	I	With SO ₄ and Cl above 50 mg/litre Ratio=(Alk/50)/(SO ₄ /48+Cl/35.5) > 5.0 Water is Stable Ratio= (SO ₄ /48+Cl/35.5)/(Alk/50) > 0.2 Water is Corrosive	
Total Hardness (Ca & Mg)	mg/litre	CaCO ₃	I	<200	< 400

Specifications for water quality intended for human consumption from the source and piped water supply for the protection of infrastructure against corrosion					
Status				Ranges and upper limits	
Interpretation				(Ideal guideline)	(Acceptable Standard)
DETERMINANTS	Unit	Format	Concern	95 Percentile requirement	
CORROSIVE AND SCALING PROPERTIES (ground water)					
Calcium Carbonate Precipitation Potential	mg/litre	CCPP	I	4 - 5	3 - 15
Alkalinity/Sulphate/Chloride Ratio	Equivalents	Corrosivity Ratio	I	With SO ₄ and Cl above 50 mg/litre Ratio=(Alk/50)/(SO ₄ /48+Cl/35.5) > 5.0 Water is Stable Ratio=(SO ₄ /48+Cl/35.5)/(Alk/50) > 0.2 Water is Corrosive	
Total Hardness (Ca & Mg)	mg/litre	CaCO ₃	I	<400	< 1000

Table 1.4: Frequency of Microbiological Monitoring (including Turbidity values) for Water Supply and Distribution

Size of population served	Turbidity 95%**	Frequency of sampling
> 250 000	< 0,5 NTU	Thrice weekly ***
100 001 – 250 000	< 1,0 NTU	Twice weekly
50 001 – 100 000	< 1,0 NTU	Once weekly
10 001 – 50 000	< 1,0 NTU	Three times every month
< 10 000 reticulated	< 1,0 NTU	Once every 1 month*
< 10 000 non-reticulated	1 – 2 NTU	Once every 1 month*

* Upon complaints by the consumers or of medical practitioners and after incidents such as pipe breaks, the frequency should be increased until the situation has returned to original counts and been declared safe;

** Average or 95 percentile turbidity of the water supplied;

*** The frequency should be stepped up by one extra sampling per week for every 100 000 residents (including the estimated number of visitors residing within the area at any time) in the area served, over and above 250 000.

General Information

1. The area being monitored must be defined by the Minister in consultation with the Minister responsible for health and, if applicable, relevant officials from regional council and local authorities.

2. At the time of sampling the operator must also take a “free chlorine” reading of the same water under examination, but prior to sampling for microbiological sampling, whilst using a portable device designed for that purpose and accepted by the Minister; this ‘reading’ is to be recorded and reported together with the results from the microbiological analyses.
3. As for field ‘screening’ of water supplies for microbiological contamination there exist portable devices designed for that purpose and accepted by the Minister, and these ‘readings’ are to be recorded and reported together with the results from the microbiological analyses.
4. The results of the microbiological monitoring together with the free chlorine readings are to be reported as per mutual agreement to the ultimate supplier (bulk water supplier, local authority or any other supplier) for remedial action where required, and to the Minister for record and monitoring purposes and follow up actions.
5. The costs of routine monitoring must be borne by the authority commissioning the monitoring.
6. The US-EPA 2012 (update) Drinking Water Standards and Health Advisories must be used to prescribe the maximum disinfection dosages when considered necessary by the Minister.
7. Biological monitoring of invertebrates must be conducted using the NASS method as prescribed in the guidelines by the Minister.

Methodology for Sampling and Analyses

The methodologies to be followed for sampling and the procedure during transit and storage of samples prior to analysis are as follows:

1. Preferably samples must be taken in borosilicate glass bottles with a glass or polypropylene screw-cap lid.
2. Where this is not feasible or practical polyethylene bottles with internal seal and with screw-lid may be used.
3. Samples must, as far as practical, be analysed within 24 hours of sampling.
4. If there are special requirements for the period between sampling and analysis to be less than 24 hours, the requirement must be attended to as far as is practical.
5. Samples must to be kept and stored, even during transit, at as low a temperature as is practically manageable, whilst preventing the risk of the sample freezing.
6. The sample must be kept away from light and shielded from sunlight, to reduce chances of micro-/biological growth to a minimum.
7. The use of preservation chemicals in respect of a sample should be considered, planned and executed with extreme care.
8. If sample preservation is appropriate or required, an extra smaller volume sample should be taken so as to not upset any other analyses that are affected by the preservation chemical(s).
9. Certain determinants may be monitored ‘in the field’ at the time of sampling; such field-data are to be measured in a receptacle or container different from the sample container; data so obtained must be recorded as “field measurement” and cannot replace laboratory analysis for the parameters concerned.

10. The methodologies followed for physical, chemical and microbiological analysis must be in agreement with the specifications listed in the latest edition of the SANS 241, Drinking Water Standards, published by the SABS.
11. The cost of routine, regulatory inspections and monitoring for the purpose of fulfilling the provisions of this regulation must be borne by the service provider.

ANNEXURE 2
(Regulations 5, 68(2) and 69)

RE-USE APPLICATIONS FOR DIFFERENT TREATMENTS

Table 2.1: Mining and Industrial Re-use

Application in	Primary and Secondary Ponds	OD – Oxidation Ponds with 40 day maturation pond retention time	Primary and Secondary Treatment, <u>not</u> adhering to General Standard	Primary and Secondary Treatment, adhering to General Standard	Primary, Secondary and Tertiary Treatment*, adhering to Special Standard
1. Food Processing	Not permissible	Not permissible	Not permissible	Not permissible	Not permissible
2. Mining and industry: <ul style="list-style-type: none"> • process water; • cooling towers; • Mineral recovery 	Not permissible	Not permissible	<ul style="list-style-type: none"> - Permissible on merit provided human contact is excluded; - All taps and draw-off points must contain clear notices indicating water not suitable for human consumption 	<ul style="list-style-type: none"> - Permissible provided human contact is excluded; - All taps and draw-off points must contain clear notices indicating water not suitable for human consumption 	<ul style="list-style-type: none"> - Permissible provided human contact is excluded; - All taps and draw-off points must contain clear notices indicating water not suitable for human consumption

3. Dust control on roads.	Not permissible	<ul style="list-style-type: none"> - Permissible; - Human contact to be excluded; - Proper disinfection at all times required; - Excessive spraying and pool forming must be avoided. 	<ul style="list-style-type: none"> - Permissible; - Human contact to be excluded; - Proper disinfection at all times required; - Excessive spraying and pool forming must be avoided, 	<ul style="list-style-type: none"> - Permissible; - Human contact to be excluded; - Proper disinfection at all times required. 	<ul style="list-style-type: none"> - Permissible; - Human contact to be excluded; - Proper disinfection at all times required.
		<ul style="list-style-type: none"> - No smell nuisance; - No excessive spraying or pool forming allowed, because underground water may become contaminated; - Direct human contact with spray must be avoided as far as possible; - Effluent must be prevented from being used for domestic purposes; - Container(s) used for transportation of effluent must be effectively cleaned and disinfected immediately after use. 			
4. Sundry uses not mentioned in this guideline.	Not permissible	Permissible on merit in exceptional cases only	<ul style="list-style-type: none"> - Each case will be treated on its merits - The emphasis must be on the <i>E.coli</i> count - The effluent must be free from parasitic ova, pathogenic organisms, toxic substances, etc. 	<ul style="list-style-type: none"> - Each case will be treated on its merits - The emphasis must be on the <i>E.coli</i> count - The effluent must be free from parasitic ova, pathogenic organisms, toxic substances, etc. 	<ul style="list-style-type: none"> - Each case will be treated on its merits - The emphasis must be on the <i>E.coli</i> count - The effluent must be free from parasitic ova, pathogenic organisms, toxic substances, etc.

* **Sand and Granular Activated Carbon Filtration and Disinfection must form part of the Tertiary Treatment steps if conventional treatment processes are used.**

Table 2.2: Agricultural Re-use

Irrigation of	Primary and Secondary Ponds	Oxidation Pond with 40 day maturation pond	Primary and Secondary Treatment, <u>not</u> adhering to General Standard	Primary and Secondary Treatment, adhering to General Standard	Primary, Secondary and Tertiary Treatment*, adhering to Special Standard
1. Vegetables and crops consumed raw by humans (3 excluded)	Not permissible	Not permissible	Not permissible	Not permissible	Any type of irrigation permissible
2. Vegetables and crops <u>not</u> consumed raw by humans	Not permissible	Not permissible	Not permissible	<ul style="list-style-type: none"> - Flood and drip irrigation permissible provided products are not directly exposed to spray - Effective draining and drying before harvesting; - Fallen produce unsuitable for human consumption 	Any type of irrigation permissible

3. Fruit trees and vineyards for the cultivation of fruit which is consumed raw by humans	Not permissible	<ul style="list-style-type: none"> - Flood and drip irrigation permissible on merit provided fruits are not directly exposed to spray; - Effective draining and drying before harvesting - Fallen fruit is unsuitable for human consumption 	<ul style="list-style-type: none"> - Flood and drip irrigation permissible on merit, provided fruits are not directly exposed to spray - Effective draining and drying before harvesting - Fallen fruit is unsuitable for human consumption 	<ul style="list-style-type: none"> - Flood and drip irrigation permissible on merit provided fruits are not directly exposed to spray - Effective draining and drying before harvesting - Fallen fruit is unsuitable for human consumption 	Any type of irrigation permissible
4. Cultivation of cut flowers	Not permissible	<ul style="list-style-type: none"> - Flood and drip irrigation permissible on merit provided flowers are not directly exposed to spray; - Effective draining and drying before harvesting essential 	<ul style="list-style-type: none"> - Flood and drip irrigation permissible on merit provided flowers are not directly exposed to spray; - Effective draining and drying before harvesting essential 	<ul style="list-style-type: none"> - Any type of irrigation permissible - Effective draining and drying before harvesting essential 	Any type of irrigation permissible

5. Grazing for milk or meat producing animals	Not permissible	Not permissible	Not permissible	<ul style="list-style-type: none"> - Flood and drip irrigation permissible on merit; - Not permissible as drinking water for animals - Effective draining and drying before consumption 	<ul style="list-style-type: none"> - Any type of irrigation permissible; - Permissible as drinking water for animals.
6. <ul style="list-style-type: none"> - Crops not for grazing, but utilized as dry fodder; - Crops cultivated for seeds purpose only; - Tree plantations; - Nurseries (cut flower excluded, see 4) 	Not permissible	<ul style="list-style-type: none"> - Any type of irrigation permissible on its merits - No over-irrigating or pool forming - No smell nuisance - Properly fenced (no public allowed) - No meat animals, milk producing animals or poultry permissible 	<ul style="list-style-type: none"> - Any type of irrigation permissible on its merits - No over-irrigating or pool forming - No smell nuisance - Properly fenced (no public allowed) - No meat animals, milk producing animals or poultry permissible 	Any type of irrigation permissible	Any type of irrigation permissible

* **Sand and Granular Activated Carbon Filtration and Disinfection must form part of the Tertiary Treatment steps if conventional treatment processes are used.**

Table 2.3: Landscape Irrigation

Irrigation of	Primary and Secondary Ponds	Oxidation Ponds with 40 day maturation pond	Primary and Secondary Treatment, <u>not</u> adhering to General Standard	Primary and Secondary and Tertiary Treatment, adhering to General Standard	Primary and Secondary & Tertiary Treatment*, to Special Standard
1. Lawns at swimming pools, nursery schools, children's' playgrounds	Not permissible	Not permissible	Not permissible	Not permissible	<ul style="list-style-type: none"> - Any type of irrigation permissible; - No public allowed during irrigation, only allowed after effective draining/drying.
2. School grounds and public parks (children's' playground excluded, see 1).	Not permissible	<ul style="list-style-type: none"> - Only flood or drip, no spray irrigation permissible; - No over-irrigation and no pool forming allowed; - No public allowed during irrigation, only allowed after effective draining / drying. 	<ul style="list-style-type: none"> - Only flood or drip, no spray irrigation permissible; - No over-irrigation and no pool forming allowed; - No public allowed during irrigation, only allowed after effective draining/drying. 	<ul style="list-style-type: none"> - Any type of irrigation permissible; - No public allowed during irrigation, only allowed after effective draining/drying. 	<ul style="list-style-type: none"> - Any type of irrigation permissible; - No public allowed during irrigation, only allowed after effective draining/drying.

3. Parks - only for beautifying flowerbeds, traffic islands etc. (not recreation areas)	Not permissible	<ul style="list-style-type: none"> - Only flood or drip, no spray irrigation permissible; - No public allowed during irrigation. 	<ul style="list-style-type: none"> - Only flood or drip, no spray irrigation permissible; - No public allowed during irrigation. 	<ul style="list-style-type: none"> - Any type of irrigation permissible; - No public allowed during irrigation. 	Any type of irrigation permissible.
4. Sports fields where limited contact is made with the surface (golf course, cricket and hockey fields)	Not permissible	<ul style="list-style-type: none"> - Only flood or drip, no spray irrigation permissible; - No over-irrigation and no pool forming allowed; - No players or public during irrigation; - Players and public allowed only after effective draining and drying. 	<ul style="list-style-type: none"> - Only flood or drip, no spray irrigation permissible; - No over-irrigation and no pool forming allowed; - No players or public during irrigation; - Players and public allowed only after effective draining and drying. 	<ul style="list-style-type: none"> - Any type of irrigation permissible - No over-irrigation and no pool forming allowed; - No players or public during irrigation. 	<ul style="list-style-type: none"> - Any type of irrigation permissible; - No players or public during irrigation.

5. Sport fields where regular contact is made with the surface (athletic tracks, rugby and soccer fields)	Not permissible	<ul style="list-style-type: none"> - Only flood or drip, no spray irrigation permissible; - No over-irrigation and no pool forming allowed; - No players or public during irrigation; - Players and public allowed only after effective draining and drying. 	<ul style="list-style-type: none"> - Only flood or drip, no spray irrigation permissible; - No over-irrigation and no pool forming allowed; - No players or public during irrigation; - Players and public allowed only after effective draining and drying. 	<ul style="list-style-type: none"> - Any type of irrigation permissible - No over-irrigation and no pool forming allowed; - No players or public during irrigation; - Players and public allowed only after effective draining and drying. 	<ul style="list-style-type: none"> - Any type of irrigation permissible; - No players or public during irrigation; - Players and public allowed only after effective draining and drying.
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* **Sand and Granular Activated Carbon Filtration and Disinfection must form part of the Tertiary Treatment steps if conventional treatment processes are used.**

Table 2.4: Aquaculture

Type of Re-use	Suggested Minimum Level of Treatment	Reclaimed Water Quality
Non-human food chain	Secondary + maturation ponds of at least 45 days retention	<ul style="list-style-type: none"> - $< 10^4$ thermotolerant coliforms per 100 mL
Human food chain	Tertiary treatment, including sand and carbon filtration + RO membrane filtration and final disinfection	<ul style="list-style-type: none"> - Thermotolerant coliforms < 10 cfu/100mL median value, with four of five samples containing less than 40 cfu/100mL - ≥ 1 mg/L chlorine residue after 30 mins or equivalent level of pathogen reduction

ANNEXURE 3
(Regulation 6(1))

**CLASSIFICATION OF WATERWORKS FOR THE PURIFICATION OR TREATMENT
OF WATER FOR HUMAN CONSUMPTION OR FOOD PROCESSING**

Rating:

Class of works	D	C	B	A
Range of points.	4 – 6	7 – 10	11 – 18	Above 18

Points to be awarded in accordance with the following criteria:

Classification Parameter	Parameter Selection	Point Allocation	Plant Total
Population supplied	Up to 1 000	1	
	1 001 to 5 000	2	
	5 001 to 50 000	4	
	Over 50 000	8	
Quality of intake water	Fair, with little or no variation	1	
	Seasonal variation	2	
	Monthly variation	4	
	Daily variation	8	
Process	(a) Pumping and chlorination	1	
	(b) (a) plus filtration	2	
	(c) (b) plus flocculation and clarification	4	
	(a) or (b) or (c) plus special treatment*	8	
Design capacity (m ³ /d)	Up to 50	1	
	51 to 500	2	
	501 to 5 000	4	
	Over 5 000	8	
		TOTAL	

* Special treatment: e.g. any membrane treatment, activated carbon, softening, ion exchange, fluoridation, etc.

The table above must be used as follows:

- For each parameter in column 1 select which option in column 2 best describes the facility.
- Allocate the number of points in column 4 corresponding to the selection made in column 2 and enter this point value in column 4.
- Once a point value has been allocated and entered in column 4 for each classification parameter, add all the values in column 4 to obtain a total point value.
- Use the obtained point value to assign a class of works (A, B, C or D) as per the above rating table.

ANNEXURE 4
(Regulations 7(1) and 9(1))

**CLASSIFICATION OF PERSONS (EXCLUDING UNSKILLED LABOURERS)
ACCORDING TO EDUCATIONAL QUALIFICATIONS AND EXPERIENCE
TO BE EMPLOYED FOR THE OPERATION OF A WATER
TREATMENT FACILITY AND A WATERWORK**

Minimum Requirements:

Educational	Years appropriate experience					
	CALSS					
	Trainee	I	II	III	IV	V
GRADE 8	0	-	-	-	-	-
GRADE 8 plus water treatment related course	0	6	-	-	-	-
GRADE 10 plus relevant Trade Certificate	0	4	4	-	-	-
GRADE 12 plus relevant Trade Certificate	0	2	3	-	-	-
GRADE 12 plus water related NQA accredited courst	0	1	2	3	-	-
3 YEARS B.Sc, specialising in water treatment facility and waterwork					1	5
Professional Engineer-in-Training (completion of a recognised Engineering Degree is a pre-requisite)					1	5
Professional Engineer specialising in water treatment facility and waterwork						3

ANNEXURE 5
(Regulations 7(2) and 9(1))

**MINIMUM NUMBER OF PERSONS TO BE EMPLOYED FOR THE OPERATION
OF A WATER TREATMENT FACILITY AND A WATERWORK**

Work Class	Class and number of persons as operators	Class of Person as supervisor	Class of Person for inspection quarterly ²
D	1 x Trainee	I	II
C	1 x Trainee 1 x I	II	III
B	1 x Trainee 2 x I 1 x II	III	IV
A	1 x Trainee 2 x I 1 x II 1 x III 1 x IV	IV	V

Note:

- 1) These are the minimum requirements for the operation of the various classes of water treatment facilities and waterworks and does not include maintenance or laboratory staff.

- 2) If the owner of a water treatment facility or a waterwork has no person of a class referred to above employed at the facility or waterwork, the owner must appoint a consultant with the required qualifications as prescribed in Annexure 4 in respect of that particular class of person, to visit the facility or work when necessary.

Please note, for safety reasons there must be a minimum of two people on site at any one time.

ANNEXURE 6
(Regulation 14(2)(d))

AUDIT CHECKLIST

General Audit Information

Laboratory	
Street address	
Telephone number	
E-mail address	
Audit team leader	
Audit team members	
Date	

Laboratory _____

Evaluator _____

Location _____

Date _____

Physical Facility

Item	Acceptable Yes / No	Comments
Environment		
Heating/cooling/humidity		
Lighting		
Ventilation/Fume hoods		

Cleanliness		
Electrical and water services		
Work Space		
Separation of incompatible testing areas		
Controlled access where appropriate		
Housekeeping		
Access control		
Traffic flow through work areas		
Adequate work space		
Storage		
Chemicals properly stored and dated		
Standard properly stored and dated and labelled with concentration, preparer's name and solvent, origin, purity and traceability		
Computers and automated equipment		
Provisions for disposal of waste		
Safety procedures		

Laboratory _____

Evaluator _____

Location _____

Date _____

Staff

Position/Title	Name	Educa- tional level	Specialised training	Present speciality	Experience
Laboratory manager					
Quality manager					
Technical manager					

Section heads					
Instrument operator					
Other analysts					
		Yes No	Comments		
An organisation chart available					
QA manager has line authority					
Staff job descriptions and CVs available					
Staff training documented					

Laboratory _____

Evaluator _____

Location _____

Date _____

General Laboratory Practices

Element	Satisfactory Yes / No	Comments
Awareness of general and customary safety practices		
Availability of material safety data sheets		
Monitoring of reagent water quality		

Stock control of chemicals and reference materials		
Preparation of reagents and standards		
Preparation of culture media		
Sterilisation practices		
Incubation practices		
Dishwashing procedures		
Disposal of contaminated material		

Laboratory _____

Evaluator _____

Location _____

Date _____

Quality Plan

Item	Satisfactory Yes / No	Comments
Written QA plan or equivalent		
Document control		
List of approved suppliers		
List of approved subcontractors		
Internal audits		
Review by manager		
Laboratory sample handling Log in procedure Bound log book or secure computer log in Storage Tracking		
Analytical methods Written methods available Approved methods used SOPs available and used		
Calibration Type and frequency Source of standards Data comparability		

Equipment asset list		
Blanks Reagent blanks Method blanks		
Method detection limits Initial Frequency Acceptability		
Precision and accuracy Initial Frequency Acceptability Control charts Laboratory fortified blanks Matrix duplicates		
Other QC checks Performance check samples Internal and surrogate standards Matrix spikes and replicates		
Data reduction and validation Calculations Transcription Significant figures Validation		
Analytical records		
Preventative maintenance		
Records retention		
Corrective action		
Complaints or customer survey feedback		
PT programme participation and results		

Laboratory _____

Evaluator _____

Location _____

Date _____

Laboratory _____

Evaluator _____

Location _____

Date _____

Sample collection

Items	Comments	Satisfactory	
		Yes	No
Trained sample collector			
Sampling plan			
Representative sampling			
Samples properly labeled			
Complete sample form/ analysis request form			
Appropriate sample bottles and preservation			
Samples acceptance criteria			
Sample receipt information			

Laboratory _____

Evaluator _____

Location _____

Date _____

ANNEXURE 7
(Regulation 32(7))

MINIMUM WATER QUALITY SAMPLING EQUIPMENT CHECKLIST

(Every person collecting samples must determine and identify which equipment is needed for the specific sampling requirements)

Sampling Equipment	Tick
Stopwatch (if required for flow measurements)	
pH meter and buffers or pH indicator strips	
Turbidity meter	
Temperature meter	
Additional batteries for field apparatus	

Electrical conductivity meter	
Copies of manufacturers' manuals for calibrating field instruments	
Map indicating all sampling locations	
Field notebook	
Waterproof pens, markers and pencils	
Field data forms and data labels	
Containers for purging boreholes (if no pumps available)	
Electric generator (if necessary)	
Calibrated bucket	
Sealed cooler bags (if required)	
Sterile bottles for microbiological samples	
Plastic sample bottles	
Bags of ice or freezer ice packs	
Paper towels	
Disposable latex gloves	

ANNEXURE 8
(Regulation 33(1))

SAMPLE HOLDING TIMES

DETERMINATION	CONTAINER^A	PRESERVATION	MAXIMUM HOLDING TIME
MICROBIOLOGICAL TESTS			
Coliform	P/G, sterile	Cool, ≤6°C, 0.008% Na ₂ S ₂ O ₃ ^b	6-24 hours ^c
E. coli	P/G, sterile	Cool, ≤6°C, 0.008% Na ₂ S ₂ O ₃ ^b	6-24 hours ^c
Heterotrophic colony count	P/G, sterile	Cool, ≤6°C, 0.008% Na ₂ S ₂ O ₃ ^b	6-24 hours ^c
INORGANIC TESTS			
Acidity	P/G	Cool, ≤6°C	14 days ^{EPA}
Alkalinity	P/G	Cool, ≤6°C	14 days ^{EPA}
Ammonium	P/G	Analyse as soon as possible or add H ₂ SO ₄ to pH<2; cool, ≤6°C	28 days
BOD	P/G	Cool, ≤6°C	48 hours

COD	P/G	Analyse as soon as possible or add H ₂ SO ₄ to pH<2; cool, ≤6°C	28 days
Chloride	P/G	None Required	28 days
Chlorine, total, residual	P/G	Analyse immediately	0.25 hours
Colour	P/G	Cool, ≤6°C	48 hours
Fluoride	P	None Required	28 days
Hardness	P/G	HNO ₃ to pH<2	6 months
Hydrogen Ion (pH)	P/G	Analyse immediately	0.25 hours
Nitrate	P/G	Analyse as soon as possible; Cool, ≤6°C	48 hours
Nitrite	P/G	Analyse as soon as possible; Cool, ≤6°C	48 hours
Kjeldahl nitrogen	P/G	Cool, ≤6°C, add H ₂ SO ₄ to pH<2	28 days
Oxygen, Dissolved (electrode)	G	Analyse immediately	0.25 hours
Phosphate	G Only	Cool, ≤6°C	48 hours
Phosphorus, Total	P/G	Add H ₂ SO ₄ to pH <2; Cool, ≤6°C	28 days
Total dissolved solids	P/G	Cool, ≤6°C	7 days
Total suspended solids	P/G	Cool, ≤6°C	7 days
Silica	P Only	Cool, ≤6°C, do not freeze	28 days
Specific Conductance	P/G	Cool, ≤6°C	28 days
Sulphate	P/G	Cool, ≤6°C	28 days
Temperature	P/G	None Required	Analyse immediately
Turbidity	P/G	Analyse the same day; store in dark up to 24 h; Cool, ≤6°C	48 hours
METALS			
Metals, except Cr VI and Mercury	P/G	HNO ₃ to pH<2	6 months
Chromium VI	P/G	Cool, ≤6°C	24 hours
Mercury	P/G	HNO ₃ to pH<2	28 days

For parameters not listed, use glass or plastic containers; preferably refrigerated during storage and analyse as soon as possible.

Notes:

- (a) P = Plastic (polyethylene of equivalent; G = Glass.
- (b) If the water sample contains residual chlorine, 10% sodium thiosulfate is used to dechlorinate.
- (c) The maximum holding time is dependent on the geographical proximity of sample source to the laboratory.

ANNEXURE 9
(Regulation 37)

Minimum analysis coverage range of parameters

Physiochemical Parameters	Microbiological Parameters
pH	Heterotrophic colony count
Electrical conductivity	Total coliforms
Total dissolved solids, determined	Faecal coliforms or E. Coli
Turbidity	
Colour	
Alkalinity/acidity	
Chloride	
Fluoride	
Nitrate	
Nitrite	
Sulphate	
Total hardness, calcium hardness, magnesium hardness	
Sodium	
Potassium	
Calcium	
Magnesium	
Iron	
Manganese	
Silica	
Dissolved oxygen	
Redox potential	
Biological oxygen demand (BOD)	
Chemical oxygen demand (COD)	
Ammonium	
Total nitrogen / Kjeldahl nitrogen	
Ortho-phosphate	
Free and total chlorine	

ANNEXURE 10
(Regulation 64)

CATEGORIES OF DRILLER'S LICENSES

Category	Drilling Method	Diameter mm (in)	Minimum Depth (m)	Formation Hardness	Compressor Capabilities	Auxiliary Equipment	Weight on Bit Collars	Pump Capacity	Grouting & Sealing capacity	Zone Testing	Yield Testing	Hole Development
Category 1 a	Air Percussion Drilling - DTHH	508 (20)	100	Soft to Hard	2 units - 900cfm at 350 psi i.e 1,530l/s at 24 bar	Bits, Hammers and Stabilisers	40t	Not Applicable	508mm to 100m	Single or Double Packers	100 m ³ /h for 100m head	By airlift, double tube and packers
Category 1 b	Air Percussion Drilling - DTHH	444 (17½)	500	Hard	2 units - 900cfm at 350 psi i.e 1,530l/s at 24 bar	Bits, Hammers and Stabilisers	40t	Not Applicable	444mm to 500m	Single or Double Packers	100 m ³ /h for 100m head	By airlift, double tube and packers
Category 1 c	Air Percussion Drilling - DTHH RC	444 (17½)	500	Hard	2 units - 900cfm at 350 psi i.e 1,530l/s at 24 bar	Bits, Hammers and Stabilisers	40t	Not Applicable	444mm to 500m	Single or Double Packers	100 m ³ /h for 100m head	By airlift, double tube and packers
Category 1 d	Mud Rotary and Air Rotary Drilling	508 (20)	100	Soft to Hard	1 unit - 600cfm at 350 psi i.e 1,000l/s at 24 bar	Bits, Hammers and Stabilisers	40t	250m ³ /h at 10 bar	508mm to 100m	Single or Double Packers	100 m ³ /h for 100m head	By airlift, double tube and packers

Category 1 e	Mud Rotary and Air Rotary Drilling	444 (17½)	500	Hard	1 unit - 600cfm at 350 psi i.e 1,000l/s at 24 bar	Bits, Hammers and Stabilisers	40t	250m³/h at 10 bar	444mm to 500m	Single or Double Packers	100 m³/h for 100m head	By airlift, double tube and packers
Category 1 f	RC Mud Rotary Drilling by Airlift	444 (17½)	500	Hard	1 unit - 600cfm at 350 psi i.e 1,000l/s at 24 bar	Suitably Equipped Top Head Rig	40t	Not Applicable	444mm to 500m	Single or Double Packers	100 m³/h for 100m head	By airlift, double tube and packers
Category 2 a	Air Percussion Drilling - DTHH	254 (10)	150	Soft to Hard	1 unit - 900cfm at 350 psi i.e 1,530l/s at 24 bar	Bits, Hammers and Stabilisers	2.5t	Not Applicable	250mm to 150m	Not Required	15m³/h for 100m head	By airlift, double tube and packers
Category 2 b	Air Percussion Drilling - DTHH	203 (8)	300	Soft to Hard	1 unit - 900cfm at 350 psi i.e 1,530l/s at 24 bar	Bits, Hammers and Stabilisers	2.5t	Not Applicable	200mm to 300m	Not Required	15m³/h for 100m head	By airlift, double tube and packers
Category 2 c	Air Percussion Drilling - DTHH	165 (6½)	300	Soft to Hard	1 unit - 900cfm at 350 psi i.e 1,530l/s at 24 bar	Bits, Hammers and Stabilisers	2.5t	Not Applicable	165mm to 350m	Not Required	15m³/h for 100m head	By airlift, double tube and packers
Category 2 d	Mud Rotary Drilling	311 (12¼)	200	Soft to Medium	none	Bits, Hammers and Stabilisers	12t	125m³/h at 10 bar	311mm to 200m	Not Required	15m³/h for 100m head	By airlift, double tube and packers

Category 2 e	Mud Rotary Drilling	254 (10)	300	Soft to Medium	none	Bits, Hammers and Stabilisers	12t	125m ³ /h at 10 bar	250mm to 300m	Not Required	15m ³ /h for 100m head	By airlift, double tube and packers
Category 3 a	Cable Tool Percussion Drilling	254 (10)	50	Soft to Hard	None	Bits, collars and jars	NA	NA	Not required	Not Required	15m ³ /h for 100m head	Surging, brushing and bailing
Category 3 b	Cable Tool Percussion Drilling	165 (6 1/2)	200	Soft to Hard	None	Bits, collars and jars	NA	NA	Not required	Not Required	15m ³ /h for 100m head	Surging, brushing and bailing
Category 4 a	Other Drilling Techniques: Auger Drilling, Core Drilling, Wire-line drilling, well construction, wellpoints and shaft sinking (will be awarded on individual merit)											
Category 4 b	Well constructors, Borehole Deepening, Enlarging, Altering, Cleaning, Rehabilitating or Sealing off; and Insertion of Well-points (will be awarded on individual merit)											
Technical Requirements:	Work in unconfined aquifers, outside of water protected areas: All licensed contractors											
	Work in complex and confined aquifers within water protected areas: All licensed contractors with >5 year's experience											

ANNEXURE 11
(Regulation 67)

**WATER QUALITY STANDARDS WITH WHICH EFFLUENT
DISCHARGE MUST COMPLY**

Table 1: Water Quality Standards for Effluent

Effluent to be discharged or disposed of in areas with potential for drinking water source contamination; international rivers and dams and in water management and other areas				
			Special Standard	General Standard
DETERMINANTS	UNIT	FORMAT	95 percentile requirements	
PHYSICAL REQUIREMENTS				
Temperature	° C		Not more than 10P ^{OP} C higher than the recipient water body	
Turbidity	NTU		< 5	< 12
PH			6,5-9,5	6,5-9,5
Colour	mg/litre Pt		< 10	< 15
Smell			No offensive smell	
Electric conductivity 25 °C	mS/m		< 75 mS/m above the intake potable water quality	
Total Dissolved Solids	mg/litre		< 500 mg/litre above the intake potable water quality	
Total Suspended Solids	mg/litre		< 25	< 100
Dissolved oxygen	% saturation		>75	>75
Radioactivity	Units		below ambient water quality of the recipient water body	
ORGANIC REQUIREMENTS				
Biological Oxygen Demand	mg/litre	BOD	< 10	< 30
Chemical Oxygen Demand	mg/litre	COD	< 45	< 100
Detergents (soap)	mg/litre		< 0.2	< 3
Fat, oil & grease, individual	mg/litre	FOG	nil	< 2.5
Phenolic compounds	mg/litre	as phenol	< 0.01	< 0.10
Aldehyde	µg/litre		< 50	< 100
Adsorbable Organic Halogen	µg/litre	AOX	< 50	< 100
INORGANIC MACRO DETERMINANTS				
Ammonia (NHB _{4B} - N)	mg/litre	N	< 1	< 10
Nitrate (NOB _{3B} - N)	mg/litre	N	< 15	< 20
Nitrite (NOB _{2B} - N)	mg/litre	N	< 2	< 3
Total Kjeldahl Nitrogen (TKN)	mg/litre	N	< 18	< 33
Chloride	mg/litre	Cl	< 40 mg/litre above the intake potable water quality	< 70 mg/litre above the intake potable water quality

Effluent to be discharged or disposed of in areas with potential for drinking water source contamination; international rivers and dams and in water management and other areas				
			Special Standard	General Standard
DETERMINANTS	UNIT	FORMAT	95 percentile requirements	
Sodium	mg/litre	N	< 50 mg/litre above the intake potable water quality	<90 mg/litre above the intake potable water quality
Sulphate	mg/litre	SOB _{4B}	< 20 mg/litre above the intake potable water quality	< 40 mg/litre above the intake potable water quality
Sulphide	mg/litre	S	< 0.05	< 0.5
Fluoride	mg/litre	F	1,0	2,0
Cyanide (Free)	µg/litre	CN	< 30	< 100
Cyanide (recoverable)	µg/litre	CN	< 70	< 200
Soluble Ortho phosphate	mg/litre	P	< 0.2	3,0
Zinc*	mg/litre	Zn	1	5

Effluent to be discharged or disposed of in areas with potential for drinking water source contamination; international rivers and dams and in water management and other areas				
			Special Standard	General Standard
DETERMINANTS	UNIT	FORMAT	95 percentile requirements	
INORGANIC MICRO DETERMINANTS				
Aluminium	µg/litre	Al	< 25	< 200
Antimony	µg/litre	Sb	< 5	< 50
Arsenic	µg/litre	As	< 50	< 150
Barium	µg/litre	Ba	< 50	< 200
Boron	µg/litre	B	< 500	< 1000
Cadmium*	µg/litre	Cd	< 5	< 50
Chromium, (hexavalent)	µg/litre	Cr	< 10	< 50
Chromium, Total*	µg/litre	Cr	< 50	< 1000
Copper*	µg/litre	Cu	< 500	< 2000
Iron	µg/litre	Fe	< 200	< 1000
Lead*	µg/litre	Pb	< 10	< 100
Manganese	µg/litre	Mn	< 100	< 400
Mercury*	µg/litre	Hg	< 1	< 2
Nickel	µg/litre	Ni	< 100	< 300
Selenium	µg/litre	Se	< 10	< 50
Strontium*	µg/litre	Sr	< 100	< 100
Thallium	µg/litre	Tl	< 5	< 10
Tin*	µg/litre	Sn	< 100	< 400
Titanium	µg/litre	Ti	< 100	< 300
Uranium*	µg/litre	U	< 15	< 500

Effluent to be discharged or disposed of in areas with potential for drinking water source contamination; international rivers and dams and in water management and other areas				
			Special Standard	General Standard
*Total for Heavy Metals (Sum of Cd,Cr,Cu,Hg, Peri-Urban Development Board	µg/litre	Cd,Cr,Cu, Hg & Pb	< 200	< 500
UNSPECIFIED COMPOUNDS FROM ANTHROPOGENIC ACTIVITIES				
Agricultural chemical compounds	µg/litre		Any in-/organic compound recognized as an agro-chemical is to be avoided or reduced as far as possible. Maximum acceptable contaminant levels will be site specific, dependent on chemical usage and based the water quality of the recipient water body	
Industrial and mining chemical compounds, including unlisted metals and persistent organic pollutants	µg/litre		Any in-/ organic compound recognized as an industrial chemical including unlisted metals is to be avoided or reduced as far as possible. Maximum acceptable contaminant levels will be site specific dependent on chemical usage and based the water quality of the recipient water body	
Endocrine Disruptive Compounds (EDC)	µg/litre		Any chemical compound that is suspected of having endocrine disruptive effects is to be avoided as far as is possible. Maximum acceptable contaminant levels will be site specific dependent on chemical usage and based the water quality of the recipient water body.	
Hydrocarbons (Benzene, Ethyl Benzene, Toluene and Xylene	µg/litre		Below detection level	Below detection level
Organo-metallic compounds: methyl mercury, tributyl tin (TBT), etc.	µg/litre		Below detection level	Below detection level
DISINFECTION				
Residual chlorine	mg/litre		< 0.1 Dependent on recipient water body	< 0.3 Dependent on recipient water body

Effluent to be discharged or disposed of in areas with potential for drinking water source contamination; international rivers and dams and in water management and other areas				
			Special Standard	General Standard
DETERMINANTS	UNIT	FORMAT		
BIOLOGICAL REQUIREMENTS (Algae and parasites)				
Further treatment of the effluent is dependent on: <ol style="list-style-type: none"> 1. the water quality of the recipient water body if any 2. the distance from any point of potable water abstraction 3. an acceptable maximum contaminant level downstream of the point of discharge 4. the exposure to human and animal consumption downstream of the point of discharge 5. any re-use option that may be implemented.. 				
MICROBIOLOGY				
Further treatment of the effluent is dependent on: <ol style="list-style-type: none"> 1. the water quality of the recipient water body if any 2. the distance from any point of potable water abstraction 3. an acceptable maximum contaminant level downstream of the point of discharge 4. the exposure to human and animal consumption downstream of the point of discharge 5. any water re-use option that may be implemented. 				

ANNEXURE 12
(Regulation 72)

CLASSIFICATION OF DAMS ACCORDING TO WALL HEIGHT

Wall height in metres	Dam size
Up to 12	Small: Category 1 dam
More than 12 and less than 30	Medium: Category 2 dam
More than 30	Large: Category 3 dam

ANNEXURE 13
(Section 102(2) and Regulations 124 and 125)

**AQUATIC PLANT SPECIES DECLARED TO BE PROHIBITED ALIEN
INVASIVE SPECIES**

The following aquatic plant species, including any portion or the seed thereof, are considered to be alien invasive species in terms of the Water Resource Management Act, 2013, and their importation, transport and spread in the Namibian waters are prohibited.

Table 1: List of invasive aquatic plant species prohibited for introduction in the Namibian waters

NO	FAMILY/SPECIES	COMMON NAME	STATUS
1	Salviniaceae / <i>Salvinia molesta</i>	Kariba weed	PROHIBITED
2	Azollaceae / <i>Azolla filiculoides</i>	Red water fern	PROHIBITED
3	Araceae / <i>Pistia stratiotes</i>	Water Lettuce or Nile cabbage	PROHIBITED
4	Haloragaceae / <i>Myriophyllum aquaticum</i>	Parrot's feather	PROHIBITED
5	Haloragaceae / <i>Myriophyllum spicatum</i>	Spiked water milfoil	PROHIBITED
6	Hydrocharitaceae / <i>Egeria densa</i>	Dense water weed	PROHIBITED
7	Hydrocharitaceae / <i>Elodea Canadensis</i>	Canadian water weed	PROHIBITED
8	Poaceae / <i>Arundo donax</i>	Giant or Spanish reed	PROHIBITED
9	Pontederiaceae / <i>Pontederia cordata</i>	Pickerel weed	PROHIBITED
10	Pontederiaceae / <i>Eichhornia crassipes</i>	Water hyacinth	PROHIBITED

Table 2: List of invasive aquatic plant species that are already widespread

NO	FAMILY/SPECIES	COMMON NAME	STATUS
1	<i>Argemone ochroleuca</i>	Flowered Mexican poppy	PROHIBITED. Displaces other species in disturbed areas near and in watercourses
2	<i>Datura spp.</i>	Thorn Apple	PROHIBITED. Same as above
3	<i>Nicotiana glauca</i>	Wild tobacco	PROHIBITED. Invasive weed in ephemeral rivers
4	<i>Prosopis spp.</i>	Mesquite	PROHIBITED. Invasive tree in ephemeral rivers with major impact on alluvial aquifer

ANNEXURE 14
(Regulation 124(b))

**AQUATIC ANIMAL SPECIES DECLARED TO BE
RESTRICTED ALIEN INVASIVE SPECIES**

The following aquatic animal species, including any portion or seed thereof, are considered to be alien invasive species in terms of the Water Resource Management Act, 2013, and their importation, transport and spread is restricted.

Table 1: List of aquatic invasive crustaceans

NO	FAMILY/SPECIES	COMMON NAME	STATUS
1	Parastacidae / <i>Cherax quadricarinatus</i> ^a	Queensland redclaw crayfish	RESTRICTED
2	Parastacidae / <i>Cherax tenuimanus</i>	Marron crayfish	RESTRICTED
3	Parastacidae / <i>Cherax destructo</i>	Yabby crayfish	RESTRICTED
4	Parastacidae / <i>Procambarus clarkia</i> ^b	Louisiana red swamp crayfish	RESTRICTED

^a is a potentially detrimental freshwater crayfish that was introduced into supposedly controlled conditions in Namibia in 1997

^b all these have the potential to become serious pests if released into natural waters. E.g. *Procambarus clarkia*, released into Lake Naivasha in Kenya, destroyed aquatic vegetation, and due to its burrowing habit caused erosion of channels and the increased turbidity of the water caused a serious decline in the fishery.

Table 2: List of aquatic invasive fish

NO	FAMILY/SPECIES	COMMON NAME	STATUS
1	Cyprinidae/ <i>Cyprinus carpio</i> ^a	Common carp	RESTRICTED
2	Cyprinidae/ <i>Ctenopharyngodon idellus</i> ^a	Grass carp	RESTRICTED
3	Centrarchidae/ <i>Micropterus salmoides</i>	Largemouth Bass	RESTRICTED. Poses a threat to the Okavango and Kunene systems
4	Cichlidae/ <i>Oreochromis mossambicus</i> ^b	Mozambique tilapia	RESTRICTED. Listed as one of the top hundred worst invasive species by IUCN, is known to compete with indigenous species and to transfer fish parasites

^a are both considered a potential threat to the Okavango and Kunene systems and other wetlands

^b there is a danger of hybridisation between it and closely related indigenous species such as *Oreochromis. andersonni* and *Oreochromis. macrochir* should be banned from aquaculture ventures within the northern perennial river basins.

Table 3: List of aquatic invasive reptiles

NO	FAMILY/SPECIES	COMMON NAME	STATUS
1	Testudinidae/ <i>Trachemys scripta</i>	American red-eared slider	RESTRICTED. This could have major consequences if introduced into Namibian wetlands

ANNEXURE 15

APPLICATION FORM FOR REGISTRATION OF EXISTING DAM (Regulation 92(1))

An application form for the registration of an existing dam under regulation 92(1) must at least require the following information:

- (a) the name, address and contact particulars of the owner of the dam;
- (b) the name of the watercourse as indicated on the map and the locality of the dam;
- (c) the embankment type;

- (d) the height of the embankment in metres;
- (e) the height of the wall in metres;
- (f) the storage capacity of the dam in cubic metres;
- (g) if the full capacity of the dam is more 20 000 m³, whether the dam has been approved or authorised by the Minister in terms of any prior legislation; and
- (h) if the dam has been approved or authorised as contemplated in paragraph (g), particulars and proof of the approval or authorisation concerned.

ANNEXURE 16

APPLICATION FORM FOR REGISTRATION OF DAM WITH SAFETY RISK (Regulation 94(1))

An application form for the registration of a dam with a safety risk under section 97(2) of the Act must at least require the following information:

- (a) the name, address and contact particulars of the owner of the dam;
- (b) the name of the watercourse as indicated on the map and the locality of the dam;
- (c) the embankment type;
- (d) the height of the embankment in metres;
- (e) the height of the wall in metres;
- (f) the storage capacity of dam in cubic metres;
- (g) if the full capacity of the dam is more 20 000 m³, whether the dam has been approved or authorised by the Minister in terms of any prior legislation;
- (h) if the dam has been approved or authorised as contemplated in paragraph (g), particulars and proof of the approval or authorisation concerned;
- (i) the safety risk concerned; and
- (j) whether any warning signs have been erected at the dam.

ANNEXURE 17

APPLICATION FORM FOR LICENCE FOR USE OF WETLAND OR DAM (Regulation 100(1)(ii))

An application form for a licence for use of a wetland or dam must at least require the following information:

- (a) the -
 - (i) full names and surname, or in the case of a juristic person, the registered name, if any;

- (ii) identity number, or in the case of a juristic person, the registration number, if any;
- (iii) residential address, if applicable, and the work and postal addresses; and
- (iv) telephone number, cell phone number, if any, fax number and e-mail address,
of the applicant;
- (b) the name and location of the wetland or dam concerned, including maps and photographs showing the wetland or dam in relation to any watercourse and features such as roads, buildings or boundaries;
- (c) the full names and surname of the owner or occupier of the land on which the wetland or dam is situated;
- (d) the activities to be conducted in respect of the wetland or dam;
- (e) the -
 - (i) proposed quantity of resources of the wetland or dam to be used; or
 - (ii) proposed number of people using the resources per month in the case of the use of the wetland or dam for commercial recreational purposes; and
- (f) the proposed duration of the use of the wetland or dam.

ANNEXURE 18

APPLICATION FOR LICENCE TO IMPORT, TRANSPORT OR SPREAD RESTRICTED ALIEN INVASIVE SPECIES (Section 102(1) read with section 101(1) and Regulation 126)

An application form for a licence to import, transport or spread restricted alien invasive species must require at least the following information:

- (a) the -
 - (i) full names and surname, or in the case of a juristic person, the registered name, if any;
 - (ii) identity number, or in the case of a juristic person, the registration number, if any;
 - (iii) residential address, if applicable, and the work and postal addresses; and
 - (iv) telephone number, cell phone number, if any, fax number and e-mail address,
of the applicant;
- (b) the name and location of the watercourse from which the species will be imported, transported or spread;
- (c) the name and location of the proposed translocation site, including maps and photographs showing the site in relation to the watercourse;

- (d) the names of the owner and occupier of the land on which the proposed species will be introduced; and
- (e) the proposed quantity of species to be imported, transported or spread.

ANNEXURE 19

APPLICATION FOR LICENCE TO REMOVE RIPARIAN SPECIES, FILL OR
EXCAVATE RIPARIAN ZONE OR ERECT STRUCTURAL
DEVELOPMENT WITHIN RIPARIAN ZONE
(Section 103 and Regulation 139)

An application form for a licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within riparian zone must require at least the following information -

- (a) the -
 - (i) full names and surname, or in the case of a juristic person, the registered name, if any;
 - (ii) identity number, or in the case of a juristic person, the registration number, if any;
 - (iii) residential address, if applicable, and the work and postal addresses; and
 - (iv) telephone number, cell phone number, if any, fax number and e-mail address, of the applicant;
- (b) the name and location of the wetland or dam concerned, including maps and photographs showing the wetland or dam in relation to any watercourse and features such as roads, buildings or boundaries;
- (c) the full names and surname of the owner or occupier of the land on which the wetland or dam is situated;
- (d) the activities to be conducted in respect of the wetland or dam;
- (e) the -
 - (i) proposed quantity of resources of the wetland or dam to be used; or
 - (ii) proposed number of people using the resources per month in the case of the use of the wetland or dam for commercial recreational purposes; and
- (f) the proposed duration of the use of the wetland or dam.

ANNEXURE 20**FEES****(Sections 41(2)(b), 44(2)(c), 49(2)(c), 56(3)(d), 64(2)(c), 72(1)(c), 78(2)(c) and 80(2)(c))**

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1.	Application fee for licensing of privately owned laboratory to test and ascertain the quality of water supply (Regulation 12(2))	100
2.	Application fee for a licence as a water service provider (Regulation 43(2))	100
3.	Application fee for a licence to abstract and use water (Regulation 44(2))	100
4.	Application fee for the renewal of a licence to abstract and use water (Regulation 45(2))	100
5.	Application fee for a borehole licence (Regulation 46(2))	100
6.	Application fee for groundwater disposal licence (Regulation 47(2))	100
7.	Application fee licence to store groundwater in artificial recharge scheme (Regulation 49(2)(c))	100
8.	Application fee for driller's licence (Regulation 64(2))	100
9.	Application fee for licence to discharge effluent or construct or operate wastewater treatment facility or waste disposal site (Regulation 66(2))	100
10.	Application fee for renewal of licence to discharge effluent or construct or operate a wastewater treatment facility or waste disposal site (Regulation 70(2))	100
11.	Application fee for transfer of licence to discharge effluent or construct or operate a wastewater treatment facility or waste disposal site (Regulation 71(2))	100
12.	Fee for registration of existing dam (Regulation 92(2))	100
13.	Fee for registration of dam with safety risk (Regulation 94(2))	100
14.	Application fee for licence for use of wetland or dam (Regulation 100(2)(c))	100
15.	Application fee for renewal of licence for use of wetland or dam (Regulation 105(2))	100
16.	Application fee for licence for removal of rocks, sand or gravel from a watercourse for sale or commercial exploitation (Regulations 114(2)(b) and 119(2))	100
17.	Application fee for licence to import, transport or spread restricted alien invasive species (Regulation 126(2)(c))	100
18.	Application fee for renewal of licence to import, transport or spread restricted alien invasive species (Regulation 131(2))	100

19.	Application fee for licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone (Regulation 139(2)(c))	100
20.	Application fee for renewal of licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone (Regulation 114(2))	100

ANNEXURE 21

LICENCE TO TEST AND ASCERTAIN QUALITY OF WATER (Regulation 13(5)(c)(i))

A licence to test and ascertain the quality of water must specify, among other things, the -

- (a) full name or registered name of the holder of the licence;
- (b) full name or registered name and the location of the laboratory;
- (c) full name, postal address, physical address, science related qualifications, and number of years of science related work experience, of the person who is to manage the laboratory which is licensed to test and ascertain the quality of water;
- (d) conditions subject to which the licence is granted;
- (e) duration of the licence;
- (f) fact that the licence is subject to periodic review and to amendment, suspension or cancellation in accordance with these regulations; and
- (g) frequency of review of the licence.

ANNEXURE 22

LICENCE TO OPERATE, OR STORE WATER IN, AN ARTIFICIAL RECHARGE SCHEME (Section 44(1) and Regulation 49(4)(a) and (5))

A licence to operate, or store water in, an artificial recharge scheme must specify, among other things, the -

- (a) full name or registered name of the holder of the licence;
- (b) location of the artificial recharge scheme;
- (c) conditions subject to which the licence is granted;
- (d) duration of the licence;
- (e) fact that the licence is subject to periodic review and to amendment, suspension or cancellation in accordance with these regulations; and
- (f) frequency of review of the licence.

ANNEXURE 23**LICENCE FOR REMOVAL OF ROCKS, SAND OR GRAVEL
(Regulation 117(1))**

A licence for removal of rocks, sand or gravel must, among other things, specify the -

- (a) full name or registered name of the holder of the licence;
- (b) purpose for which the licence is granted;
- (c) location of the removal site;
- (d) conditions subject to which the licence is granted;
- (e) duration of the licence;
- (f) fact that the licence is subject to periodic review and to amendment, suspension or cancellation in accordance with these regulations; and
- (g) frequency of review of the licence.

ANNEXURE 24**LICENCE TO IMPORT, TRANSPORT OR SPREAD RESTRICTED
ALIEN INVASIVE SPECIES
(Regulation 129)**

A licence to import, transport or spread restricted alien invasive species must, among other things, specify the -

- (a) full name or registered name of the holder of the licence;
- (b) purposes and alien invasive species for which the licence is granted;
- (c) location of the site to which the alien invasive species contemplated in paragraph (a) are to be transported or spread;
- (d) conditions subject to which the licence is granted;
- (e) duration of the licence;
- (f) fact that the licence is subject to periodic review and to amendment, suspension or cancellation in accordance with these regulations; and
- (g) frequency of review of the licence.

ANNEXURE 25**DESIGN REPORT FOR CATEGORY 1 DAM
(Regulation 74(2))**

A design report in respect of a proposed project to build a Category 1 dam must include the following information:

- (a) with regard to the general details of the project -
 - (i) the name, address and contact particulars of the owner of the dam and that of the person in control;
 - (ii) the locality of the dam, including -
 - (aa) the description as contained in the title deed of the property concerned;
 - (bb) magisterial district, nearest local authority area in which the proposed project is situated;
 - (cc) the distance to the nearest local authority area;
 - (dd) the name of the river or watercourse in which the proposed project is situated, if any;
 - (ee) the location in terms of latitude and longitude, to the nearest second of accuracy; and
 - (ff) the water management area in which the proposed project is situated;
 - (iii) the purpose of the scheme, the water use and the users of the water; and
 - (iv) in the case of an enlargement, alteration or repair of an existing dam, a description of the nature and extent of the intended enlargement, alteration or repair;
- (b) with regard to the hydrological particulars of the project -
 - (i) the catchment area;
 - (ii) the catchment parameters;
 - (iii) the mean annual precipitation;
 - (iv) the storage capacity of the dam;
 - (v) the surface area of the dam at full supply level;
 - (vi) the elevation versus capacity and elevation versus surface area curves for the dam;

- (vii) the design flood and the estimated annual exceedance probability of the design flood;
 - (viii) the regional maximum flood, if applicable, depending on the size of the catchment area; and
 - (ix) the safety evaluation flood and the estimated annual exceedance probability of the safety evaluation flood;
- (c) with regard to the particulars of the proposed dam and structural stability -
- (i) the type of wall, with an indication of the quantities of construction material such as volume of earth fill, concrete, masonry and rock fill;
 - (ii) the maximum wall height of the dam;
 - (iii) the base width and crest width at the maximum cross-section;
 - (iv) the slope of the upstream and the downstream sides and nature of slope protection measures;
 - (v) the total crest length of the wall;
 - (vi) a description of the construction materials for use in different zones of the wall, with an indication of their composition, nature and origin;
 - (vii) a description of the general nature and distribution of the materials forming the foundation of the dam;
 - (viii) a description of seepage control measures;
 - (ix) a description of seepage monitoring measures; and
 - (x) a statement of load assumptions, methods of calculation, assumed material properties and design norms used for the stability calculations;
- (d) with regard to the particulars of hydraulic structures and components -
- (i) a description of the type of spillway;
 - (ii) the height difference between the spillway crest and the lowest part of the non-overspill crest, excluding camber;
 - (iii) the total freeboard of the dam;
 - (iv) the crest length of the spillway;
 - (v) the relative elevations of the river bed immediately downstream of the structure (that is lowest downstream ground elevation on the outside of the dam wall), spillway crest and non-overspill crest;
 - (vi) the maximum discharge capacity of the spillway before overtopping of the non-overspill crest;
 - (vii) a description of any type of energy dissipaters and their dimensions;

- (viii) a description of the river diversion works, when applicable;
 - (ix) a description of the outlet works of the dam; and
 - (x) the number of days needed to draw down the water-level of the dam to different depths between full and 10% of the full water depth with no flow into the dam;
- (e) with regard to precautions and measures to ensure public safety -
- (i) the designation of restricted areas such as -
 - (aa) the dam wall or certain portions thereof;
 - (bb) the entrance to the spillway;
 - (cc) the spillway;
 - (dd) the spillway return channel;
 - (ee) energy dissipaters;
 - (ff) plunge pool;
 - (gg) outlet works;
 - (hh) any other ancillary structures on or near the dam;
 - (ii) a specified zone of a reservoir upstream of the dam wall between the left bank and right bank; and
 - (jj) a specified zone of the river downstream of the dam between left bank and right bank;
- (ii) the provision of a floating safety boom upstream of the spillway, if applicable;
 - (iii) the provision of safe access within designated areas of the dam wall or ancillary structures;
 - (iv) if applicable, the provision of parapet walls, handrails, guard rails, fences or vehicle barriers;
 - (v) the provision of appropriate warning signs at the dam wall and ancillary structures; and
 - (vi) the provision of appropriate warning signs related to the use of the dam for recreational purposes, at or nearby the dam wall, if required by the Minister;
- (f) with regard to the particulars relating to the construction of the works -
- (i) particulars of the quality control to be applied;
 - (ii) the planned date of commencement of the construction work;

- (iii) the expected duration of the construction work;
- (iv) the name, address and contact particulars of the contractor, if known;
- (v) the name, address and contact particulars of the person responsible for supervision during the construction phase, if known;
- (g) the evaluation of the safety of existing development contemplated in regulation 76(2); and
- (h) the name, address, contact particulars and qualifications of the person responsible for the design of the project.

ANNEXURE 26

DESIGN REPORT IN RESPECT OF CATEGORY 2 DAM (Regulation 78(2))

A design report in respect of a proposed project to build a Category 2 dam must include the following information -

- (a) with regard to the general particulars of the project -
 - (i) the name, address and contact particulars of the owner of the dam and that of the person in control;
 - (ii) the locality of the dam, including -
 - (aa) the description as contained in the title deed of the property concerned;
 - (bb) magisterial district, nearest local authority area in which the proposed project is situated;
 - (cc) the distance to the nearest local authority area;
 - (dd) the name of the river or watercourse in which the proposed project is situated (if any);
 - (ee) the location in terms of latitude and longitude (to the nearest second of accuracy); and
 - (ff) the water management area in which the proposed project is situated;
 - (iii) the purpose of the scheme, the water use and the users of the water;
 - (iv) in the case of an enlargement, alteration or repair of an existing dam, a description of the nature and extent of the intended alteration, enlargement or repair;
- (b) with regard to the hydrological particulars of the project -
 - (i) the catchment area;
 - (ii) the catchment parameters;

- (iii) the mean annual precipitation;
 - (iv) the storage capacity of the dam;
 - (v) the surface area of the dam at full supply level;
 - (vi) the elevation versus capacity and elevation versus surface area curves for the dam;
 - (vii) the hydrological methods used to determine the flood estimates;
 - (viii) the design flood and the estimated annual exceedance probability thereof;
 - (ix) the regional maximum flood, if applicable, depending on the size of the catchment area;
 - (x) the safety evaluation flood and the estimated annual exceedance probability thereof;
 - (xi) particulars of the design and safety evaluation flood hydrographs, indicating the criteria, data source and methods used for their determination; and
 - (xii) inflow and outflow hydrographs for design flood and safety evaluation flood conditions when significant attenuation of a flood entering the dam is expected, with a full motivation for selection of attenuated floods;
- (c) with regard to the particulars of the hydraulic structures and components -
- (i) the type of spillway and its dimensions;
 - (ii) the amount of dry freeboard (that is the vertical difference between the design flood level and the non-overspill crest);
 - (iii) the relative elevations of the river bed immediately downstream from the structure (or the lowest downstream ground elevation on the outside of the dam wall), spillway crest and non-overspill crest;
 - (iv) the maximum discharge capacity of the spillway before overtopping of the non-overspill crest;
 - (v) a description of any spillway gates and associated equipment;
 - (vi) the operating rules for the spillway gates;
 - (vii) the energy dissipaters and their dimensions;
 - (viii) a description of the flood-handling procedure, indicating the criteria and methods used to determine the dimensions of the spillways, energy dissipaters and river diversion works, when applicable;
 - (ix) the tail water-level during the design flood;
 - (x) a description of the auxiliary spillway and its function, if applicable;
 - (xi) a description of the outlet works; and

- (xii) the number of days needed to draw down the water-level of the dam to different depths between full and 10% of the full water depth with no flow into the dam;
- (d) with regard to the structural design and stability of the dam, ancillary structures and foundations -
- (i) the type of wall, with an indication of the quantity of construction material such as the volume of earth fill, rock fill, concrete, and masonry;
 - (ii) the maximum wall height of the dam;
 - (iii) the base width and crest width at the maximum cross-section;
 - (iv) the upstream and downstream slope;
 - (v) the total crest length of the wall;
 - (vi) a general engineering description of the construction materials, including the parameters used in the design of the different zones of the wall, with an indication of their source (that is borrow areas), composition, nature, grading and geological origin;
 - (vii) design assumptions, design parameters, load combinations, methods of calculation, assumed material properties and design norms;
 - (viii) geological maps and profiles with a description of the general geology of the dam site and the classification of foundation materials to indicate their engineering geological characteristics, including the parameters used in the design, geological composition, type, origin and distribution; and
 - (ix) if requested by the Minister in writing, a dam safety risk analysis or risk assessment on the dam or both the dam safety risk and risk assessment on the dam, ancillary structures and foundations with an indication of probabilities of failure;
- (e) with regard to precautions and measures to ensure public safety -
- (i) the designation of restricted areas such as -
 - (aa) the dam wall or certain portions thereof;
 - (bb) the entrance to the spillway;
 - (cc) the spillway;
 - (dd) the spillway return channel;
 - (ee) energy dissipaters;
 - (ff) plunge pool;
 - (gg) outlet works;
 - (hh) any other ancillary structures on or near the dam;

- (ii) a specified zone of a reservoir upstream of the dam wall between the left bank and right bank; and
 - (jj) a specified zone of the river downstream of the dam between left bank and right bank;
- (ii) the provision of a floating safety boom upstream of the spillway, if applicable;
- (iii) the provision of safe access within designated areas of the dam wall or ancillary structures;
- (iv) if applicable, the provision of parapet walls, handrails, guard rails, fences or vehicle barriers;
- (v) the provision of appropriate warning signs at the dam wall and ancillary structures; and
- (vi) the provision of appropriate warning signs related to the use of the dam for recreational purposes, at or nearby the dam wall, if required by the Minister;
- (f) the estimated life of the dam;
- (g) if requested by the Minister in writing, a de-commissioning plan;
- (h) the evaluation of the safety of existing development contemplated in regulation 81(2); and
- (i) the name, address, contact particulars and qualifications of the person responsible for the design of the project.

ANNEXURE 27

DESIGN REPORT IN RESPECT OF CATEGORY 3 DAM (Regulation 84)

A design report in respect of a proposed project to build a Category 3 dam must include the following information -

- (a) with regard to the general particulars of the project -
 - (i) the name, address and contact particulars of the owner of the dam and that of the person in control;
 - (ii) the locality of the dam, including -
 - (aa) the description as contained in the title deed of the property concerned;
 - (bb) magisterial district, nearest local authority area in which the proposed project is situated;
 - (cc) the distance to the nearest local authority area;
 - (dd) the name of the river or watercourse in which the proposed project is situated (if any);

- (ee) the location in terms of latitude and longitude (to the nearest second of accuracy); and
 - (ff) the water management area in which the proposed project is situated;
- (iii) the purpose of the scheme, the water use and the users of the water;
- (iv) in the case of an enlargement, alteration or repair of an existing dam, a description of the nature and extent of the intended alteration, enlargement or repair;
- (b) with regard to the hydrological particulars of the project -
 - (i) the catchment area;
 - (ii) the catchment parameters;
 - (iii) the mean annual precipitation;
 - (iv) the storage capacity of the dam;
 - (v) the surface area of the dam at full supply level;
 - (vi) the elevation versus capacity and elevation versus surface area curves for the dam;
 - (vii) the hydrological methods used to determine the flood estimates;
 - (viii) the design flood and the estimated annual exceedance probability thereof;
 - (ix) the regional maximum flood, if applicable, depending on the size of the catchment area;
 - (x) the safety evaluation flood and the estimated annual exceedance probability thereof;
 - (xi) particulars of the design and safety evaluation flood hydrographs, indicating the criteria, data source and methods used for their determination; and
 - (xii) inflow and outflow hydrographs for design flood and safety evaluation flood conditions when significant attenuation of a flood entering the dam is expected, with a full motivation for selection of attenuated floods;
- (c) with regard to the particulars of the hydraulic structures and components -
 - (i) the type of spillway and its dimensions;
 - (ii) the amount of dry freeboard, that is the vertical difference between the design flood level and the non-overspill crest;
 - (iii) the relative elevations of the river bed immediately downstream from the structure (or the lowest downstream ground elevation on the outside of the dam wall), spillway crest and non-overspill crest;
 - (iv) the maximum discharge capacity of the spillway before overtopping of the non-overspill crest;
 - (v) a description of any spillway gates and associated equipment;

- (vi) the operating rules for the spillway gates;
 - (vii) the energy dissipaters and their dimensions;
 - (viii) a description of the flood-handling procedure, indicating the criteria and methods used to determine the dimensions of the spillways, energy dissipaters and river diversion works, when applicable;
 - (ix) the tail water-level during the design flood;
 - (x) a description of the auxiliary spillway and its function, if applicable;
 - (xi) a description of the outlet works; and
 - (xii) the number of days needed to draw down the water-level of the dam to different depths between full and 10% of the full water depth with no flow into the dam;
- (d) with regard to the structural design and stability of the dam, ancillary structures and foundations -
- (i) the type of wall, with an indication of the quantity of construction material such as the volume of earth fill, rock fill, concrete, and masonry;
 - (ii) the maximum wall height of the dam;
 - (iii) the base width and crest width at the maximum cross-section;
 - (iv) the upstream and downstream slope;
 - (v) the total crest length of the wall;
 - (vi) a general engineering description of the construction materials, including the parameters used in the design of the different zones of the wall, with an indication of their source (that is borrow areas), composition, nature, grading and geological origin;
 - (vii) design assumptions, design parameters, load combinations, methods of calculation, assumed material properties and design norms;
 - (viii) geological maps and profiles with a description of the general geology of the dam site and the classification of foundation materials to indicate their engineering geological characteristics, including the parameters used in the design, geological composition, type, origin and distribution; and
 - (ix) if requested by the Minister in writing, a dam safety risk analysis or risk assessment on the dam or both the dam safety risk and risk assessment on the dam, ancillary structures and foundations with an indication of probabilities of failure;
- (e) with regard to precautions and measures to ensure public safety -
- (i) the designation of restricted areas such as -
 - (aa) the dam wall or certain portions thereof;
 - (bb) the entrance to the spillway;

- (cc) the spillway;
 - (dd) the spillway return channel;
 - (ee) energy dissipaters;
 - (ff) plunge pool;
 - (gg) outlet works;
 - (hh) any other ancillary structures on or near the dam;
 - (ii) a specified zone of a reservoir upstream of the dam wall between the left bank and right bank; and
 - (jj) a specified zone of the river downstream of the dam between left bank and right bank;
- (ii) the provision of a floating safety boom upstream of the spillway, if applicable;
 - (iii) the provision of safe access within designated areas of the dam wall or ancillary structures;
 - (iv) if applicable, the provision of parapet walls, handrails, guard rails, fences or vehicle barriers;
 - (v) the provision of appropriate warning signs at the dam wall and ancillary structures; and
 - (vi) the provision of appropriate warning signs related to the use of the dam for recreational purposes, at or nearby the dam wall, if required by the Minister;
- (f) an evaluation of the reliability and acceptability of the hydrological data used for the design of the spillway and river diversion;
 - (g) the results of the proposed flood handling procedure applied to various alternative inflow hydrographs;
 - (h) the calculated or model study results to demonstrate the hydraulic characteristics of the spillways and energy dissipaters;
 - (i) if requested by the Minister in writing, the results of backwater curve calculations upstream of the dam wall;
 - (j) if requested by the Minister in writing, an evaluation of the expected rate of silting and its influence on backwater curves along and upstream of the dam;
 - (k) the hydraulic aspects of the river diversion works;
 - (l) the discharge curves for outlets that could be used to lower the water-level in the dam;
 - (m) geological maps and profiles with a description and evaluation, based on tests performed on samples or in situ tests, of the distribution and engineering-geological characteristics of foundation materials and geological discontinuities that could have an effect on the dam wall;

- (n) an evaluation of the stability of natural slopes in and in the immediate proximity of the dam based on a geological map with information on the distribution and characteristics of geological materials and discontinuities;
- (o) an evaluation of the potential for induced seismicity by the dam, if appropriate, and an evaluation of the natural seismicity at sources within a radius that could have an impact on the dam based on a geological map with information on the distribution and characteristics of geological materials and discontinuities, and particulars of any historical earthquakes which had a significant effect at the dam site;
- (p) a description of the scope of the materials investigations for the dam and foundations and results obtained;
- (q) the results of structural and stability analyses of the dam and foundations, including safety factors, stresses and displacements;
- (r) a discussion of the objectives and design principles of the monitoring equipment and instrumentation layout;
- (s) the estimated life of the dam;
- (t) if requested by the Minister in writing, a de-commissioning plan;
- (u) the evaluation of the safety of existing development contemplated in regulation 87(2); and
- (v) the name, address, contact particulars and qualifications of the person responsible for the design of the project.

ANNEXURE 28

LICENCE FOR USE OF WETLAND OR DAM (Regulation 103)

A licence for the use of a wetland or a dam must specify the -

- (a) name and location of the wetland or dam in respect of which the application for the licence is granted;
- (b) full names and surname or the registered name of the holder of the licence;
- (c) which purposes the wetland or dam concerned may be used;
- (d) conditions subject to which the licence is granted;
- (e) duration of the licence;
- (f) fact that the licence is subject to periodic review and to amendment, suspension or cancellation in accordance with these regulations; and
- (g) frequency of review of the licence.

ANNEXURE 29**LICENCE TO REMOVE RIPARIAN SPECIES, FILL OR EXCAVATE RIPARIAN ZONE
OR ERECT STRUCTURAL DEVELOPMENT WITHIN RIPARIAN ZONE
(Regulation 142(1))**

A licence to remove riparian species, fill or excavate a riparian zone or erect a structural development within a riparian zone must specify the -

- (a) name, location and limits of the watercourse in respect of which the application for the licence is granted;
 - (b) full names and surname or the registered name of the holder of the licence;
 - (c) activities referred to in regulation 138(a), (b) or (c) in respect of which the licence is granted;
 - (d) conditions subject to which the licence is granted;
 - (e) duration of the licence;
 - (f) fact that the licence is subject to periodic review and to amendment, suspension or cancellation in accordance with these regulations; and
 - (g) the frequency of review of the licence.
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