



DEPARTMENT OF WATER AFFAIRS & FORESTRY

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WINDHOEK

NAMIBIA

**PERMIT CONDITIONS FOR WASTEWATER TREATMENT SYSTEMS IN TERMS
OF THE WATER RESOURCES ANAGEMENT ACT (ACT 11 OF 2013)**

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1. RECOMMENDATIONS

It is recommended that a Wastewater and Effluent Disposal Exemption Permit in terms of Section 21 and 22 of the Water Act, (Act 54 of 1956) or sectionof the Water Resources Management Act (Act 11 of 2013), be granted to the **Permit Applicant** exempting it from compliance with the provisions of **Section.....andof the Water Act, (Act 54 of 1956) or The Water Resources Management Act (Act 11 of 2013)** in order that the wastewater produced by the **Permit Applicant** be treated in the Wastewater Treatment System and the final effluent be disposed of as stated below:

Final effluent be disposed off

- by reused for irrigation purposes
- by reused for washing of piggeries
- by total evaporation
- by French drain,
- in a Water Course
- by reclamation for potable water purposes

Sludge, screenings and other solid waste generated on site

- be disposed of at the solid waste disposal site

2. PERMIT CONDITIONS

GENERAL

- 2.1 Provided that the conditions specified below are complied with, this permit shall be valid for **five (5) (case specific)** years as from the date of issue. If, however, the **Average Dry Weather Flow** exceeds the Design Flow of the wastewater treatment plant before the expiry dates, this permit shall lapse. In either event an application for the replacement of this permit shall be submitted to the **Permanent Secretary for Agriculture, Water and Forestry (MAWF)** for the attention of the **Deputy Director: Policy and Law Administration Division**.

The application should reach **MAWF** at least two (2) months before the expiry date or alternatively two (2) months before the determined flow is expected to be exceeded.

- 2.2 The wastewater treatment plant shall be enclosed with a 1.8 meter high jackal-proof or diamond-mesh fence culminated by two (2) strands of barbed wire.
- 2.3 The gates to the terrain shall be kept locked at all times when not attended by an operator.
- 2.4 The wastewater treatment plant and irrigation lands shall be protected against stormwater flow by contour walls or stormwater channels.

- 2.5 The disposal of effluent and operation of the system as a whole shall be carried out in such a manner that no health hazards, nuisances or pollution of surface/underground water occur. No raw wastewater shall be allowed to be discharged to the environment.
- 2.6 Sludge from the **Drying Beds, Settling Tanks, Septic Tanks, Conservancy Tanks** and the periodic cleaning of all units within the treatment plant, screening and floating debris shall be dried then can either be buried in trenches allowing a soil cover of 50 cm deep at a suitable site where it will not cause health nuisance or give rise to secondary pollution of surface/underground water or be disposed of at a Solid Waste Disposal Site. None of this shall be made available to any person for any purpose.
- 2.7 No intractable or toxic waste shall be allowed to find its way into the wastewater treatment system. This includes any chemicals that are toxic to the biological life within the system, that are not biodegradable or that prevent the system from operating effectively.
- 2.8 No water source or occupied building should be allowed within a distance of 500 m to 1000 m from the nearest wastewater treatment plant, **except for Septic/Conservancy Tanks in accordance to occupied building.**
- 2.9 Weatherproof warning notices indicating that the wastewater treatment plant site is out of bounds, and human consumption or any other use of the wastewater effluent is prohibited, shall be prominently displayed at the access gate and on all four (4) sides of the enclosure. These notices shall be written in the official language and in a vernacular commonly spoken language in that particular area, or may be represented symbolically.
- 2.10 The wastewater treatment plant and its area shall be cleared of overgrown vegetation on a regular basis.
- 2.11 The outfall area of treated wastewater and the disposal of solid waste shall be out of bounds, except for operational and maintenance personnel working on the premises.
- 2.12 The wastewater treatment system as a whole should be regularly maintained for mechanical items employed (e.g. motors, pumps, cracks, pipes) are functioning properly in order to detect leakages, malfunctions and all repairs must be attended to immediately.
- 2.14 All substances used for any purposes (e.g. disinfection, micro-organisms growth enhancement) in the wastewater treatment system dosing rates should be regularly monitored.
- 2.15 The growth of algae film in the wastewater treatment system should be controlled regularly.
- 2.16 For mining operations and similar activities, the applicant should abide by the conditions as stipulated on the ***regulation made in terms of section 26 (c) and (d) of the Water Act, Act 54 of 1956 as Water Amendment Act, No. 51 of 1979***

- 2.17 All wastewater treatment systems operation, monitoring and general management should be guided by the two Acts: ***Water Act, Act 54 of 1956 as Water Amendment Act, No. 51 of 1979*** and the newly proclaimed ***Water Resources Management Act, Act 11 of 2013*** and the subsequent supporting documents (Regulations, Manual Codes of Practices, Policies and Plans)

DIFFERENT TYPE OF WASTEWATER TREATMENT SYSTEMS

A. SEPTIC/CONSERVANCY TANKS

- 2.16 All septic tank facilities must be constructed in accordance with the recommendations of the ***National Building Research Institute as laid down in their Information Sheet X/BOU 2-14***. The Department of Water Affairs and Forestry Code of Practice on Septic Tank Systems may be used as a guideline.
- 2.17 Septic tanks may be constructed of any suitable non-corrosive material and must provide an average retention period of at least twenty-four (24) hours.
- 2.18 Septic tank construction shall incorporate a vertical baffle to enhance the removal of sludge and floating debris and a manhole to facilitate desludging.
- 2.19 The septic tank shall not be washed or disinfected after pumping nor shall its content be emptied into storm drains or discharged directly into streams or any watercourse.

B. OXIDATION PONDS

- 2.20 The construction of the ponds shall be in such a manner that no groundwater pollution takes place, thus all the ponds shall be lined with an appropriate material (e.g. GSE leak geomembrane). The Department of Water Affairs and Forestry Code of Practice on Pond Systems may be used as a guideline.
- 2.21 The oxidation ponds shall be protected against stormwater flow by contour walls or storm water channels.
- 2.22 The effluent from the ponds shall not be emptied into storm drains or be discharged directly into streams, a watercourse or the environment unless it complies with the Namibian Water Quality General Standard for Effluent.

C. BIOFILTERS (TRICKLING FILTERS)

- 2.23 No treated wastewater shall be allowed to be discharged within a minimum distance of 1000 m from any production or supply borehole, potable water source that may be affected or an alluvial aquifer or connection to such alluvial bed.

- 2.24 Construction of pipes, the material chosen and its installation shall be done in such a manner as to avoid any risk of spillage, pollution or other nuisance.
- 2. 25 The filter media, nozzles on the rotating arms should be checked and cleaned regularly to avoid clogging/blockage.
- 2. 26 The effluent from bio-filters shall not be emptied into storm drains or be discharged directly into streams, a watercourse or the environment unless it complies with the **Namibian Water Quality General Standard for Effluent**.
- 2.27 The raw wastewater inlet to every filter and the final effluent should be sampled in order to monitor the loading rates.
- 2.28 To avoid plugging, the slime film of each filter should be observed for odour, smell and possible overloading
- 2.29 The pH values should be kept in the range of 6.5 - 9.5 to control smell and odour produced by green-brownish water color should be carried out regularly

D. ACTIVATED SLUDGE

- 2.30 No treated wastewater shall be allowed to be disposed within a minimum distance of 1000m from any production or supply borehole, potable water source that may be affected or an alluvial aquifer or connecting to such alluvial bed. The Regulations may specify this differently.
- 2.31 Construction of pipes, the material chosen and its installations shall be done in such manner as to avoid any risk of spillage, pollution or other nuisance.
- 2.32 The effluent from the activated sludge shall not be emptied into storm drains or be discharged directly into streams, a watercourse or the environment unless it complies with the **Namibian Water Quality General Standard for Effluent**.
- 2.33 The screens and detritus channels should be cleaned regularly and waste materials be discarded into the municipal waste site or buried in prepared pits where it will not cause health nuisance or give rise to secondary pollution of surface/underground water.
- 2.34 The dissolved oxygen (DO) in the aeration basin and DO concentration should be tested and should be close to 2 mg/ℓ (between 1.5 and 3 mg/ℓ).

- 2.35 A wastewater treatment specialist/consultant should be employed or temporarily contracted to assess the **Activated Sludge System** at least twice per year and carry out certain inspections and tests in order to advise on changes in the operation or additional, periodic maintenance to be undertaken. This will include (as a minimum):
- 2.35.1 Checking, assessment and reporting on the performance of the operator(s);
 - 2.35.2 Checking, assessment and reporting on the general condition of the site (e.g. neatness, tidiness, maintenance of fence and gate);
 - 2.35.3 Note and raise any concern regarding possible leaks or situation that may lead to contamination of the groundwater or endanger human and/or animals;
 - 2.35.4 Checking of flow meter readings (check condition of flow meter);
 - 2.35.5 Checking of Dissolved Oxygen in aerobic reactor;
 - 2.35.6 Collect a set of composite samples of the inflow and final effluent (minimum requirement). Ideally, each unit process should be sampled and analysed to assess its operation and to build up a database;
 - 2.35.7 Observations of smell and colour should be noted as this can serve as an indication check for possible overloading of plant or malfunctioning;
 - 2.35.8 Measurements of pH and DO to confirm the observations indicated by smell and colour;
 - 2.35.9 Checking, assessment and reporting on dosing rates, condition of dosing equipment, performance of the disinfection system;
 - 2.35.10 Checking, assessment and reporting on all other mechanical equipment installed;
 - 2.35.11 Compile a report of all findings. This report should be made available on request to DWAF;

E. REEDBED SYSTEM

- 2.36 A wastewater treatment specialist/consultant should be employed or temporarily contracted to assess the **Reedbed System** at least twice per year and carry out certain inspections and tests in order to advise on changes in the operation or additional, periodic maintenance to be undertaken. This will include (as a minimum):
- 2.36.1 The **Root Zone Beds = Reedbed System**, ponds and flow of effluent to the system shall be supervised by a suitably experienced person in the employ of the **Permit Holder**. The

person must have under his/her control an adequate number of suitably trained employees who shall ensure the satisfactory functioning of the system at all times.

2.36.2 The **Root Zone Beds** and ponds shall be protected against stormwater flow by contour walls or stormwater channels.

2.36.3 Any overflow from the **Reedbeds Systems** can be utilised for the irrigation of fruit trees, crops not consumed raw by man, pastures or crops for industrial use as long as it complies with the prescribed standards for irrigating of such crops.

F. TAILINGS DAMS FOR MINING OPERATIONS

2.37 The nature of mining process shall not be changed so as to alter the quality of effluent or waste material originating from the mine, milling or metallurgical plant operations without prior approval from the **Ministry of Agriculture, Water and Forestry**.

2.37.1 The locality of **Solid Waste Disposal Sites** should be carefully considered and provision shall be made to prevent storm water from flowing through the waste rock disposal site

2.37.2 All sumps and pumping installations including catchment dams for the recycling of water, shall be design and of adequate capacity to prevent the uncontrolled flow of water from the mining operations at any time.

2.37.3 Effective measure shall be taken to control all mine effluents so that no uncontrolled flow takes place that would lead to uncontrolled seepage.

2.37.4 The mining operations shall be conducted in such a way that chemicals and oil will not be disposed of in any way result in the incorporation of these substances in any water course.

2.37.5 All water which is pumped from the underground operational areas shall be used in the metallurgical plant.

2.37.6 The slimes/tailings dams shall be built and protected in such a way that all rain water precipitated thereon will be retained. The storage capacity of the slimes dam shall be sufficient to ensure a free board of 0,5 meters above the expected maximum water level which may occur due to rain over a period of 24 hours with a frequency of once in hundred (100) years.

2.37.7 Rainwater from tailings dams and appurtenant barrier dams and water used in any process of the mining operation shall be recycled whenever possible.

2.37.8 An adequate system e.g **ditches, drains, pipes or any other facility** build with the purpose to catch seepage water and carry it to evaporation dams or to sumps for recycling, shall be constructed at all tailings disposal sites whenever seepage occurs.

2.37.9 The **Permit Holder** shall make adequate provision to ensure that all run-off due to rainfall on a property on which the operation is situated, is controlled in such a manner by a system of storm-water drains that it flows clear of **slimes/tailings dams, mineral, waste rock disposal sites and other sources of pollution**.

- 2.37.10 Regional rainfall and evaporation figures shall be based on information obtainable from the **Meteorological Office, within the Ministry of Works and Transport**.
- 2.37.11 The **Permit Holder** is required without causing **soil erosion, cause damage to dams, storm-water drains and other waterways** to be kept free of plant life at all times and other material which may decreased the effectiveness thereof or impede the flow of water.
- 2.37.12 The **Permit Holder** shall not allow any **mineral, tailings or waste-rock disposal site, hazardous waste disposal sites, slime dam or evaporation dam** to be sited on water-logged ground or on ground liable to become water-logged, unstable or cracked, or on ground where the slope could occasion a landslide.

IRRIGATION WITH EFFLUENT

- 2.38 Any irrigation scheme shall be carefully designed and properly operated by the **Permit Holder** or by the third party under an agreement, but responsibility of adherence to permit conditions lies with the **Permit Holder**.
- 2.38.1 The irrigation scheme shall comply with the conditions as laid down in the Department of National Health and Welfare's Guide: "**Permissible utilization and disposal of treated wastewater effluent**", and shall incorporate the following features:
- 2.37.1 The piping used for effluent shall be marked different from other piping in order to avoid confusion with drinking water pipes
- 2.37.2 The taps, valves and sprayers of the irrigation system shall be so designed that only authorised persons can bring them into operation.
- 2.37.3 All irrigation points where uninformed persons could possibly drink effluent water shall be provided with written or symbolic notices indicating the danger thereof.
- 2.37.4 No sports men shall be allowed onto the sports fields during irrigation and should only be allowed to do so, twenty-four (24) hours after irrigation.
- 2.37.5 No livestock shall be allowed within the irrigation area.
- 2.38 The process units in the wastewater treatment system should be modified such as to produce the final effluent that complies with the required standards for irrigation. The DWAF "**Code of Practice: Wastewater Reuse**", which must be used as a guideline is attached to this permit.

MONITORING, SAMPLING AND REPORTING

- 2.39 There shall be sufficient meters to allow for an accurate compilation of water balance records showing accurate potable water use and wastewater production. All potable water and wastewater meters shall be in a satisfactory operational state at all times.
- 2.40 Monthly records of the incoming flow to the wastewater treatment plant of **Permit Holder** shall be kept and submitted to the Permanent Secretary of the Ministry of Agriculture, Water and Forestry on request.
- 2.41 The final effluent from the **Permit Holder** wastewater treatment plant shall be analysed **once a month** for the following parameters; **pH, total dissolved solids, conductivity, free and saline ammonia, magnesium, oxygen absorbed, kjeldahl nitrogen, chemical oxygen demand, phosphate and faecal coliforms**. The results of analysis shall be submitted to the Permanent Secretary of the Ministry of Agriculture, Water and Forestry bi-annually or on request. The **Permit Holder** will be responsible for the cost of analyses to be carried out.
- 2.42 The effluent used for the irrigation shall be analysed **monthly** for the following parameters: **pH, total dissolved solids, conductivity, oxygen absorbed, chemical oxygen demand, kjeldahl nitrogen, ammonia, phosphate, nitrite, nitrate, total alkalinity, total hardness, calcium, magnesium, sodium, faecal coli forms, Escherichia coli** and **any other additional parameter as deemed necessary**.
- 2.43 Any duly appointed official or representative of the Department of Water Affairs and Forestry shall have the right to inspect the wastewater treatment system and take whatever samples deemed necessary at any time.
- 2.44 A **Water Demand Management Plan** that include a summary of water balance records showing accurate figures of potable water use, wastewater produced, water re-use (if any) and losses shall be submitted to the **Permanent Secretary of the Ministry of Agriculture, Water and Forestry** annually or on request.
- 2.45 The information, results and figures requested in the paragraphs above and below shall be submitted to: **The Permanent Secretary, Ministry of Agriculture, Water and Forestry, Department of Water Affairs, Division: Policy and Law Administration, Private Bag 13193, WINDHOEK**.

RESPONSIBILITY TO AVOID POLLUTION

- 2.46 Irrespective of the conditions as set out in the permit, the **Permit Holder** shall be responsible for and take immediate remedial action should at any time there be an

unforeseen occurrence of surface or ground water pollution in or outside the jurisdictional area that can be related to the activities of the **Permit Holder**.

- 2.47 The efficiency of the effluent disposal system, seepage and pollution control from the wastewater treatment plant of the **Permit Holder** will be evaluated by some responsible person appointed by the **Permit Holder**. This person shall submit a bi-annual report to the **Permanent Secretary of Ministry of Agriculture, Water and Forestry** to review the state of water pollution control and water usage at the wastewater treatment plant situated in their jurisdictional area.

SUPERVISION

- 2.48 The wastewater treatment plant situated in the jurisdictional area of the **Permit Holder** shall be supervised by a suitably experienced person in the employ of the **Permit Holder**. This person shall have under his/her control an adequate number of suitably trained employees who shall ensure the satisfactory functioning of the system at all times.
- 2.49 The **Permit Holder** shall re-use all possible water to the satisfaction of the **Permanent Secretary of the Ministry of Agriculture, Water and Forestry** and shall continue to investigate and implement all possible areas of water saving and water reuse.
- 2.50 Any change in process techniques, change in supervision or decommissioning of the wastewater treatment system shall be reported without delay to the Permanent Secretary of MAWF.

AMENDMENTS

- 2.51 The Permanent Secretary of the Ministry of Agriculture, Water and Forestry may in writing amend, delete or replace any clause of this permit.

LEGAL ASPECTS

- 2.52 This permit does not confer exemption from compliance with the provisions of the Public Health Act 1919, (Act 36 of 1919) or any other law.
- 2.53 Contravention or failure to comply with any of these permit conditions shall constitute an offence and shall render the permit holder liable to prosecution under Section 21(8) of the

Water Act, (Act 54 of 1956) Section... of the Water Resources Management Act (Act 11 of 2013).

COMPILED BY:

DWRM

DIRECTOR: WATER RESOURCES MANAGEMENT

Please note that the treatment of wastewater in Namibia is not exclusively limited to the systems listed in the permit conditions above. The listed systems are the commonly used in the country. There are also other systems in use such as:

- ◆ **Constructed Wetlands**
- ◆ **newly introduced Vacuum System and**
- ◆ **others to be added**