

THE WATER ACT

(No. 43 of 2016)

THE WATER HARVESTING AND STORAGE REGULATIONS, 2021

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THE WATER ACT

(No. 43 of 2016)

IN EXERCISE of the powers conferred by section 142 of the Water Act 2016, the Cabinet Secretary for Water, Sanitation and Irrigation makes the following Regulations —

THE WATER HARVESTING AND STORAGE REGULATIONS,
2021

PART I— PRELIMINARY

1. These Regulations may be cited as the Water Harvesting and storage Regulations, 2021.

Citation.

2. In these Regulations, unless the context otherwise requires—

Interpretation

“Act” means the Water Act ;

No. 43 of 2016.

“applicant” means any person making an application to be licensed as an approved qualified water sector professional or a dam contractor;

“Authority” means the Water Resources Authority established under section 11 of the Act;

“base flood” means a flood having a one percent chance of being equaled or exceeded in any given year;

“Cabinet Secretary” means the Cabinet Secretary responsible for matters relating to water resources;

“dam” includes any existing or proposed structure together with appurtenant works, which is capable of containing, storing or impounding water, including temporary impoundment or storage above ground level, whether that water contains any substance or not;

“environmental impact assessment” has the meaning assigned to it by the Environmental Management and Coordination Act;

No. 8 of 1999.

“flood flow” means any flow that exceeds the Q80 flow value;

“levee” means a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding;

“maintenance” means all actions necessary for retaining water works as near as possible to its original condition, excluding rehabilitation or renewal;

“maintenance plan” means information, policies and procedures for the optimal maintenance of water works or group of water works;

“net freeboard” means the vertical distance between the maximum water surface and the crest of the dam;

“permit” means all approvals required under the Act for the construction and operation of a dam;

“proponent” means the owner, developer or other person intending to construct or constructing a dam or other waterworks;

“qualified water sector professional” means a person licensed pursuant to the Act as a water sector professional;

“water harvesting system” means a system comprising entrapment, transportation, filtration, and storage of rainwater for reuse or recharge;

“regulated watercourse” means a watercourse where the flow has been modified from its natural state by water storage or flood mitigation structures which provide a means of controlling or otherwise regulating the release of water into the natural channel;

“reservoir” means a body of water impounded by a dam or a dam with a safety risk;

“risk” means the measure of the probability and severity of an adverse effect to life, health, property or the environment;

“spillway” means a structure used to provide the controlled release of flows from a dam or levee into a downstream area typically the riverbed of the dammed river itself;

“storage capacity” means the total volume of free water excluding groundwater that could be stored below the lowest unobstructed spillway crest level or free outlet level of a dam, or below the maximum operating level established by the penstock inlet level or free decant level and as prescribed in the operation and maintenance manual or code of practice in the case of any residue deposit including tailings dams;

“storm water” means run-off water that has been concentrated by means of a drain, surface channel, subsoil drain or formed surface;

“watercourse” has the meaning assigned to it in the Act;

“water storage” means a location or structure where water is stored or retained for future use;

“Water Storage Authority” means the National Water Harvesting and Storage Authority established under section 30 of the Act;

“waterworks” means any man-made structure, apparatus, contrivance, device or thing for storing, impounding or diverting water permanently or temporarily, regulating the flow of water or containing or managing and controlling flooding and includes a dam, reservoir, water pan, dyke, levee and such like structures and devices; and

“Waterworks Development Agency” has the meaning assigned to it in the Act.

3. These Regulations shall apply to —

- (a) the policies, plans, programmes and activities of the national government, county governments and entities of the national and county governments; and

Application of the Regulations.

- (b) public and private waterworks for water harvesting and storage, reservoirs for impounding surface run-off and for regulating stream flows to synchronize them with water demand patterns and structures and devices for flood control and management.

PART I—CLASSIFICATION OF STORAGE DAMS AND OTHER WATERWORKS

4. (1) A storage dam or other waterworks shall provisionally be classified by the owner or operator as Class SD1, SD2 or SD3 on the basis of the criteria stipulated in Table 1 of the First Schedule by taking into account the risk factors set out in the Second Schedule.

Classification of dams.

(2) For purposes of determining an application for a permit for the development, operation and management of a storage dam or other waterworks or otherwise in exercise of its regulatory mandate, the Authority may affirm or vary the provisional classification assigned under sub regulation (1).

(3) In classifying a storage dam or other waterworks, the principle to be applied is that the criteria or risk factor that results in the higher class of storage dam or other waterworks shall prevail.

5. (1) The net freeboard for Class SD1 dams shall not be less than 0.6m.

Minimum net freeboard.

(2) The net freeboard for Class SD2 and SD3 dams shall—

- (a) not be less than 1.0 m; or
- (b) be as specified by the Authority

6. (1) The minimum acceptable return period for the design of a dam spillway shall be as provided in Table 5 in the Second Schedule.

Minimum spillway design flood.

(2) The Authority may require a higher return period with respect to the conditions and risks associated with a specific site.

7. (1) A national public waterworks which satisfies the criteria in sub regulation (2) shall be developed and managed under a contract with the Water Storage Authority.

National public waterworks.

(2) National public waterworks shall—

- (a) comprise of dams, reservoirs or other artificial structures constructed to control the flow of the waters of a watercourse and designed or operated to regulate stream flows to synchronise such structures with water demand patterns implemented pursuant to section 8 (2)(d) of the Act;
- (b) be of strategic or national importance;
- (c) be financed using national government monies pursuant to section 8 (1)(b) of the Act; and

(3) A national public waterworks whose primary purpose is water storage for bulk distribution and provision of water services implemented pursuant to section 8(2)(b) of the Act may be developed and operated by or under a contract with a waterworks development agency or through the mechanisms set out in section 69 of the Act.

(4) Waterworks developed and managed by the Water Storage Authority for the storage of flood flows to enable downstream releases for the purposes of flow regulation, may in addition to the impoundment and flow regulation structures associated with the storage and release of water from the reservoir, comprise structures and facilities to enable multi-purpose use such as draw-off towers that facilitate direct abstraction from the reservoir.

(5) Facilities associated with the treatment or bulk transfer of water even if forming part of a water resources storage dam that meets the criteria set out in sub regulation (2) shall not be developed or managed under a contract with the Water Storage Authority but, if financed by the national government as national public waterworks, shall be developed and managed under a contract with a waterworks development agency or through the mechanisms set out in section 69 of the Act.

(6) A private person may, under an agreement with the Water Storage Authority, and subject to compliance with the applicable law on public private partnerships, develop, operate and maintain a dam to regulate stream flows by releasing the water stored into a natural watercourse as a public private partnership venture.

(7) A county government may, with the permission of the Water Storage Authority, develop, operate and maintain a dam for water harvesting and storage for use in bulk water provision, irrigation or other approved activities.

(8) Where a water resource storage dam or reservoir has been constructed to enable multi-purpose use, a user may under a contract with the Water Storage Authority acquire rights of access to the water resources storage dam for purposes of abstraction of water directly from the dam or reservoir.

PART III—DEVELOPMENT OF WATERWORKS

8. (1) The Authority shall on behalf of the National Government, and following consultation with the Cabinet Secretary, formulate medium to long term water resources storage plans and programmes based on water allocation plans, guidelines and data gathered or submitted to the Authority.

Prior right to water for storage.

(2) The water resources plans of the Authority shall be undertaken on the basis that the right to store water shall be subject to the prior right to its uninterrupted flow required for actual and beneficial use and in compliance with the Act.

(3) The Authority, as a condition to the grant of a water use permit, may require a person applying for a permit to construct or develop a storage dam or facility to demonstrate that the proposed storage is in line with the National Government's medium and long-term plans for water resources and development.

9. (1) Prior to constructing waterworks, the applicant shall apply for and obtain—

Requirements for construction of waterworks

- (a) a water use permit issued by the Authority under the Act and the Regulations;
- (b) an environmental impact assessment licence in accordance with the Environmental Management and Coordination Act; and Act No. 8 of 1999.
- (c) authorization from the mandated lead agency where the proposed water works is to be located inside a protected area or catchment area.
- (2) Sub regulation (1) does not apply —
- (a) to works constructed in emergency circumstances;
- (b) to temporary works in operation for a period of less than two years; or
- (c) if the works are a structure less than 2 metres water depth or 10,000m³ total storage unless directed to do so by the Authority in any particular case.
- (3) Within two years after the completion of the works contemplated in sub regulation (2)(a), the owner, developer or operator of the waterworks shall —
- (a) demolish the works and restore the site; or
- (b) retain the works for purposes of water resources storage and or flood control subject to compliance with sub regulation (1).
10. (1) The person intending to develop a storage dam or other waterworks falling into class SD 2 or SD 3 in Table 1 set out in the First Schedule shall prior to commencing the construction of the waterworks undertake a feasibility study. Feasibility study.
- (2) Prior to undertaking the feasibility study contemplated in sub regulation (1), the terms of reference for the feasibility study shall be submitted by the proponent to the Authority for review and approval and in each such case the Authority shall finalize action within three months from the date of receiving the terms of reference.
- (3) The feasibility study shall —
- (a) be planned and supervised by a qualified water sector professional of the appropriate category for that class of dam and selected on the basis of the categories in Table 3 of the Second Schedule;
- (b) identify and address the risk factors associated with the particular waterworks contemplated and the class of dam;
- (c) identify and address the main factors likely to affect the safe performance of the structures to be constructed.
- (4) The feasibility study shall be submitted to the Authority for review, and if found to be satisfactory, the Authority shall within three months approve the proposal to proceed to full design.

(5) Where the Authority is not satisfied with the feasibility study, the Authority may require the proponent to enhance the feasibility study before a final decision is made.

(6) The Authority may before determining an application for a permit for a storage dam or other waterworks not required under sub regulation (1) to undertake a feasibility study, require the applicant to undertake and submit such feasibility study.

(7) The Authority shall, in granting an approval under this regulation, undertake public participation through the invitation of comments from the public and stakeholders and public meetings where necessary.

11. (1) Storage dams and other waterworks shall be designed and supervised by the appropriate category of qualified water sector professionals as set out in Table 3 in the Second Schedule.

Design by qualified water sector professional.

(2) Storage dams and other waterworks shall be constructed by the appropriate category of contractor as set out in Table 4 in the Third Schedule.

(3) A contractor undertaking construction of waterworks pursuant to these Regulations shall be a registered contractor in accordance with section 15 of the National Construction Authority Act.

No. 41 of 2011.

12. (1) An application for a permit to construct a storage dam shall be accompanied by a Dam Design Report.

Dam Design Report

(2) The format of the Dam Design Report is as set out in the Third Schedule.

(3) The level of detail required in the Dam Design Report shall be based on the professional advice of the qualified water sector professionals preparing the report taking account of the class of dam to be constructed and the risk category, provided that the Authority may, before determining the application, require the applicant to prepare and submit a more detailed report.

(4) If the circumstances require, the Authority may provisionally authorise the works on the basis of a preliminary Dam Design Report on condition that the applicant submits a complete design report acceptable to the Authority before commencement of construction of the works.

13. A person authorized to construct a storage dam shall submit a dam construction progress report at such times and intervals as may be determined by the Authority.

Dam Construction Progress Report.

14. (1) On completion of construction, the applicant shall submit to the Authority, a Dam Completion Certificate, a Dam Completion Report and a Dam Operation Report as provided in the Third Schedule.

Dam Completion Report and Dam Operation Report.

(2) A permit shall be issued by the Authority upon approval of the Dam Completion Report and Dam Operation Report.

15. An owner or operator of waterworks shall prepare and submit to the Authority for approval, a cessation or resumption plan if

Cessation or
resumption plan.

- (a) the owner or operator intends to cease, suspend, restrict or limit the operation of the dam for more than three hundred and sixty-five consecutive days; or
- (b) the owner or operator intends to resume the operation of a dam the operation of which has ceased or been suspended, restricted or limited for more than three hundred and sixty-five consecutive days; and
- (c) the dam falls within the Risk Category SD2 or SD3 as set out in the Second Schedule.

PART IV—RELEASE OF WATER FROM STORAGE DAMS AND OTHER WATERWORKS

16. The water held in the storage dams of the Water Storage Authority shall –

Release and use of
stored water.

- (a) not be diverted or abstracted for use for any purpose except with the written approval of the Authority and the Water Storage Authority; and
- (b) be released into a natural watercourse subject to reductions in volume arising from evaporation and seepage according to a water release programme provided in a Dam Operation Report and approved by the Authority.

17. (1) A holder of a permit shall pay a premium calculated in accordance with the Fourth Schedule in addition to the water use charge payable under the Act, to abstract or divert water directly from a storage dam operated by the Water Storage Authority or from a regulated watercourse downstream of a storage dam operated by the Water Storage Authority.

Premiums for use of
water from storage
facilities.

(2) The premium shall be paid on a monthly basis to the Water Storage Authority or a private owner or operator of the storage dam upon issuance of an invoice to the holder of a permit by the Water Storage Authority or private owner or operator of the dam, with a copy to the Water Resources Authority, to be used to offset a portion of the costs of operation and maintenance of the storage dam that is proportionate to the volume of the yield of the storage dam that is released into the regulated river and which the holder of a permit is entitled under his or her permit to abstract.

(3) The water use permit entitling an abstraction from a regulated river shall in addition provide for the payment to the Water Storage Authority by the holder of a permit of 20% of the premium payable under sub regulation (2) towards the Water Storage Authority's general overhead costs and any deficit in its revenue.

(4) A delay or failure to pay the premium shall attract interest at the rate of 2% for each month of such delay or failure.

(5) Any premium which is in arrears is recoverable by the Water

Storage Authority or private owner or operator of the dam as a civil debt in a court of competent jurisdiction without prejudice to the power of the Authority to treat the failure of the holder of a permit to make payment as a breach of the conditions of the permit and liable to suspension or cancellation of the permit.

18. A holder of a permit storing or arresting the flow of water by means of a dam or weir located on a body of water or watercourse shall unless otherwise decided by the Authority, provide, at a depth measured from the top of the dam or weir and to be specified by the Authority in each particular case, an outlet, controlled by a valve, sluice gate or other device, which shall be capable of being operated at all stages of the flow of such body of water or watercourse so that the normal flow or other flow as required by the Authority, of such body of water or watercourse can be passed through or around such dam or weir at all stages:

Outlets for release of stored water.

Provided that where the normal flow of the body of water or watercourse is automatically by-passed around the reservoir, without any storage or arresting of the flow of the water being effected, no such outlet works need be constructed.

19. (1) A holder of a permit, other than the Water Storage Authority, who is authorised to store or impound the water of any body of water or the operator, may release the water so stored into a natural watercourse with the approval of the Authority and, subject to the water so stored being appurtenant to the land upon which it is to be utilized, and the conditions of his or her authorization or permit authorizing the diversion or abstraction herein afterwards mentioned may, at a point downstream of the point of storage, divert or abstract from the body of water into which the stored water is released the quantity of water so released.

Authorisation for release of stored water.

(2) Except in the case of the Water Storage Authority, a holder of a permit, who has a permit to store or impound water in any body of water, or the operator, before releasing water into a natural watercourse as aforesaid, shall give to the Authority and to all persons entitled to use water from any part of the body of water between the point of release of the stored water and the points of utilization of the said water such notice of the use of the body of water for the purpose aforesaid and such particulars regarding the time during which it will be released into the body of water, the rate of discharge of the stored water and other matters as the Authority may, from time to time, require.

(3) Except with the prior written approval of the Authority, no holder of a permit, other than the holder of a permit who releases the stored water under sub regulation (1) or the operator shall divert or abstract any proportion of the flow of the body of water due to the water so released, nor shall any holder of a permit impound or store, except to such an extent as may be imposed upon him or her by the maximum capacity of his or her works for discharging the flow of the body of water through or around his or her works which abstract the flow of the water, any proportion of the flow of the body of water due to the water so released.

20. (1) The operator of a dam shall take adequate measures at his or her cost as set out in the approved Dam Operation Report set out in the Third Schedule to notify the Authority and persons downstream likely to be affected by any discharge from the dam, whether caused by dam failure or intended releases from the dam that might result in damage downstream.

Notice downstream.

(2) The operator of a dam shall take adequate measures at his or her cost as set out in the approved Dam Operation Report to protect persons, infrastructure and environments downstream likely to be affected by any discharge from the dam whether caused by dam failure or intended releases from the dam that might result in damage downstream.

(3) In the event of such a discharge or intended release, failure to follow the steps detailed in the approved Dam Operation Report shall constitute an offence punishable under the Act and these Regulations.

PART V—MAINTENANCE AND MANAGEMENT OF WATER WORKS

21. (1) An owner or operator of waterworks shall be responsible for the safety of the storage dam and shall directly or through an agent undertake the maintenance and management of the waterworks in accordance with the requirements of the maintenance and operation systems detailed in the Third Schedule.

Maintenance and management of works.

(2) Where an existing storage dam or waterworks appears not to have an owner, operator or other person or entity willing or capable of discharging the responsibilities of an owner or operator under this Part, the Water Storage Authority shall assume and discharge the responsibilities of the owner or operator pending a determination by the Cabinet Secretary of the person or entity upon whom the responsibility for the management and maintenance of the storage dam should be placed or its decommissioning as appropriate.

(3) Before the Water Storage Authority can assume the responsibilities under sub regulation (2), it shall publish a notice in the Gazette of the intention to assume responsibility and upon the expiry of the notice period, if no person claims ownership or responsibility, the notice shall take effect.

(4) For the purposes of management and maintenance of the waterworks, the owner or operator of the waterworks shall —

- (i) routine inspections;
- (ii) treatment of cracks, slides, sloughing and settlement;
- (iii) concrete repair;
- (iv) inspection and repair of spillway conduits;
- (v) establishment and control of proper vegetation to prevent erosion of embankments and earth channel surfaces;

- (vi) control of seepage in velocity and quantity;
 - (vii) rodent control;
 - (viii) installation of trashracks on pipe spillways;
 - (ix) inspection and repair of vegetated earth spillways; and
 - (x) repair of mechanical equipment;
- (a) create a monitoring and evaluation system for optimal use of the works;
- (b) implement any other measures necessary for the safe operation and management of the storage dam or water works; and
- (c) undertake an annual environmental audit on the compliance of the dam or water works with the environmental impact assessment licence and environmental management plan issued for the dam under the Environmental Management and Coordination Act. No. 8 of 1999.
22. An owner or operator of a dam shall prepare and obtain the approval of the Authority of the maintenance and management plans appropriate to the class and risk category of the storage dam as set out in the Second Schedule which shall comprise – Maintenance and management plans.
- (a) a maintenance operational plan;
 - (b) a maintenance budget;
 - (c) maintenance systems; and
 - (d) maintenance performance norms and standards.
23. (1) An owner or operator of water works shall implement a maintenance operation plan for the works appropriate to the class and risk category of the storage dam as set out in the Second Schedule. Maintenance operational plan.
- (2) An owner or operator of waterworks shall conduct a maintenance analysis for the works' infrastructure including –
- (a) identification of all the works;
 - (b) identification of critical works based upon the risk of failure; and
 - (c) analysis of the maintenance options and determination of the preferred option
24. An owner or operator of a dam shall document the results of maintenance activities and such a report shall include the following – Results of maintenance activities.
- (a) compliance with these Regulations;
 - (b) reliability of the infrastructure; and
 - (c) cost of maintenance.
25. (1) An owner or operator of waterworks shall identify maintenance requirements based on the risk of failure taking account– Maintenance requirements analysis.
- (a) the environmental impact;

- (b) public health and safety impact;
- (c) financial impact; and
- (d) service delivery impact.

(2) The impact with regard to each of the criteria shall be rated using a 5 point scale.

(3) The individual ratings will be combined into a combined rating which will be used to identify the maintenance requirements of specific waterworks.

26. (1) For each storage dam or other waterworks operated and maintained under a contract with the Water Storage Authority any maintenance costs shall be calculated by reference to scales approved by the Authority.

Infrastructure
maintenance budget.

(2) Where the maintenance budget is inadequate, the most critical maintenance action shall be undertaken.

27. (1) An owner or an operator of waterworks shall maintain a register of the water works which shall be used for the identification of all assets and which shall be updated periodically to reflect newly developed infrastructure including any alterations and material modifications.

Waterworks
infrastructure
maintenance system.

(2) The maintenance activities of the storage dam owner or operator shall be scheduled and controlled using an appropriate Waterworks Infrastructure Maintenance System.

(3) The Waterworks Infrastructure Maintenance System shall —

- (a) record the time, costs, maintenance, and other resources expended for maintenance activities;
- (b) include links to the financial management system to facilitate reconciliation of maintenance budgets;
- (c) include built-in maintenance analysis tools or ability to export information to other applications to facilitate maintenance analyses;
- (d) analyze infrastructure performance to be used as an input to maintenance planning; and
- (e) include disaster management plans for ensuring safety in the event of an emergency.

(4) The Water Storage Authority shall prepare and submit the initial Waterworks Infrastructure Maintenance System to the Authority for approval within twelve months of the commencement of these Regulations and the Authority shall finalize approval within forty-five days of submission or such extended period as may be notified by the Authority.

(5) In every subsequent year following the period provided for in sub regulation (4), the Water Storage Authority shall submit the

Waterworks Infrastructure Maintenance System to the Authority and highlight any modifications made to the previous plan.

28. (1) An owner or operator of waterworks shall — Flood control works.

- (a) continuously maintain the structures and facilities for flood control in such a manner, and for such periods as may be necessary to obtain the maximum benefit.
- (b) ensure a reserve supply of materials is maintained at the works in the event of a flood emergency.

(2) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the structure right-of-way, nor shall any change be made in any feature of the flood control works without prior determination by the owner or operator, which determination shall be documented, that such improvement excavation, construction, or alteration will not adversely affect the functioning of the flood control facilities.

(3) The improvements or alterations determined to be desirable and permissible under sub regulation (2) shall be constructed in accordance with standard engineering practice.

29. (1) An owner or operator of waterworks shall undertake periodic maintenance of levees to ensure the effectiveness of the structures when floods occur. Maintenance of levees.

(2) The maintenance activities shall be taken in order to —

- (a) promote the growth of sod;
- (b) exterminate burrowing animals;
- (c) provide for routine mowing of grass, weeds and removal of wild growth and drift deposits;
- (d) repair of damage caused by erosion or other forces; and
- (e) where practicable, to retard bank erosion by planting suitable growth on areas riverward of the levees.

(3) An owner or operator of a dam or reservoir shall undertake periodic inspections to ensure that maintenance measures are carried out effectively and to ensure that —

- (a) no unusual settlement, sloughing, or material loss of grade or levee cross section has taken place;
- (b) no caving has occurred on either the land side or the river side of the levee which might affect the stability of the levee section;
- (c) no seepage, saturated areas or sand boils occur;
- (d) toe drainage systems and pressure relief wells are in good working condition and that such facilities do not clog;
- (e) drains through the levees and gates on drains are in good working condition;

- (f) no revetment work or riprap is displaced, washed out, or removed; and
- (g) no action likely to retard or destroy the growth of sod such as as burning grass and weeds is undertaken during inappropriate seasons.

(4) During flood periods, the owner or operator of a dam or reservoir, shall monitor any levee to locate possible sand boils or unusual wetness of the landward slope and to ensure that —

- (a) slides or sloughs do not develop;
- (b) wave wash or scouring action do not occur;
- (c) no low reaches of levee exist which may be overtopped; and
- (d) no other conditions exist which might endanger the structure.

(5) The owner or operator of a dam or reservoir shall take appropriate advance measures to ensure the availability of adequate labour and materials to meet all contingencies.

(6) Immediate steps shall be taken to control any condition which endangers the levee and to repair the damaged section.

30. (1) An owner or operator of a dam or reservoir shall undertake periodic inspections to ensure that —

Maintenance of flood walls.

- (a) no seepage, saturated areas or sand boils occur;
- (b) no undue settlement occurs which may affect the stability of the wall or its water tightness;
- (c) no trees exist, the roots of which might extend under the wall and offer accelerated seepage paths;
- (d) the concrete has not cracked, chipped, or broken to the extent of affecting the stability of the wall or its water tightness;
- (e) care is exercised to prevent the accumulation of trash and debris adjacent to walls and to ensure that no fires are built near the walls;
- (f) no bank caving conditions exist riverward of the wall which might endanger its stability;
- (g) the drainage systems and pressure relief wells are in good working condition, and that such facilities are not clogged.

(2) Any inspection made under this regulation shall be made immediately prior to the beginning of the flood season, immediately following each major high water period and at intervals not exceeding ninety days.

(3) Measures and repairs deemed necessary after inspections shall be undertaken immediately and all repairs shall be accomplished by methods acceptable in standard engineering practice.

31. (1) The owner or operator of a waterworks shall —

Emergency management plans.

- (a) set the requirements for dam safety emergency planning and audits of each works' response actions; and
- (b) in consultation with the county government, local

communities and the relevant disaster management authorities, share information and engage in joint efforts to implement strategies to mitigate against the effect of disaster.

(2) The owner or operator of a dam shall prepare and submit to the Authority for approval, emergency preparedness plans for all dams and works and these plans shall —

- (a) describe the actions the owner or operator will take to address safety problems at a dam with a safety risk;
- (b) contain appropriate procedures and information to assist the owner or operator in issuing early warning notification messages to responsible disaster management authorities in the national and county governments, representatives of local county governments, representative bodies of 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
- (c) contain engineering drawings of the dam and inundation maps to show disaster management authorities critical areas for action in case of an emergency.

(3) Prioritization of planning for dam emergencies shall be determined based on relevant information including —

- (a) the condition of the dam and the degree, if any, of dam safety deficiency;
- (b) population at risk and community vulnerability;
- (c) scale of flood risk costs;
- (d) range of other consequences such as those on property, the environment or community value of the damage;
- (e) stakeholder perceptions and expectations; and
- (f) state of knowledge and planning commitments for different scenarios.

(4) The owner or operator of a dam shall engage with the county government, civil society and other stakeholders in coordination with disaster management authorities to develop community awareness strategies.

32. (1) A holder of a permit or operator of a dam shall review and update all emergency contact information contained in its emergency management plan —

- (a) at least once every twelve months; and
- (b) whenever the emergency management plan is updated.

(2) Where there is a change to emergency contact information in an emergency management plan, a holder of a permit or operator of a dam must, not later than fourteen days after the change occurs submit the updated information in writing to the Authority.

Emergency contact information.

33. (1) Every dam owner shall ensure that his or her dam is inspected in accordance with Table 6 in the Second Schedule and prepare and submit an Inspection Report in the format set out in the Third Schedule.

Inspection and inspection reports.

(2) The Inspection Report shall be submitted to the Authority within thirty days of the completion of the dam inspection.

(3) Before an application for renewal of a permit is made under these Regulations, the Authority shall ensure that the applicant has complied with dam inspection requirements.

34. (1) In the event of serious damage or failure, the holder of a permit or operator of a dam, shall submit an interim Dam Damage or Failure Report to the Authority within three days of such damage or failure and a final report as provided in the Third Schedule within twenty-one days of the event or such longer period as the Authority may approve

Dam damage or failure report.

(2) A holder of a permit or operator of a dam who fails to submit the Dam Damage or Failure Report commits an offence and is liable on conviction to the penalties prescribed under the Act.

35. (1) The holder of a permit, operator or the person having the control of any dam if required to do so by the Authority shall obtain and maintain an insurance policy to cover the risk of dam failure resulting in injury, damage to or loss of human life, health, property or the environment.

Insurance policy.

(2) The Authority shall, following consultations with industry stakeholders, set guidelines on the conditions in which it will be appropriate to obtain and maintain an insurance policy and the levels and the amount of insurance to be maintained by the holder of a permit or operator of the dam.

PART VI—STRATEGIC WATER EMERGENCY INTERVENTIONS

36. (1) The Water Storage Authority shall develop and maintain a Drought Response Plan to be implemented in collaboration with the National Drought Management Authority.

Drought Response Plan.

(2) Drought preparedness measures may include, where appropriate, designing and constructing storage dams with features and facilities enabling diversion of water from the storage dam into natural watercourses in emergency drought situations.

(3) The Authority shall, following consultation with the Cabinet Secretary, approve the Drought Response Plan with or without conditions

37. Pursuant to the Drought Response Plan, the Water Storage Authority shall implement the following measures including —

Water supply and demand management.

(a) releasing water into watercourses designed to ameliorate the effects of drought;

- (b) permitting diversion of water from a storage dam into other natural watercourses; and
- (c) ordering the abstraction of water by water service providers from the Water Storage Authority's storage dams where practicable.

38. The Water Storage Authority may adopt measures to improve systems for efficient management of stored water in order to conserve water within its water resources storage facilities during drought.

Improved system efficiency.

PART VII—CLIMATE CHANGE AND FLOOD MITIGATION

39. (1) The Water Storage Authority shall monitor, collect, collate and maintain data of floods experienced in flood prone areas including —

National water resources storage and flood control data.

- (a) information on the state of the works infrastructure;
- (b) climate reports;
- (c) base flood data;
- (d) data on flood prone areas;
- (e) information of flood inundation levels;
- (f) flood hazard maps;
- (g) flood early warning systems;
- (h) socio-economic impacts; and
- (i) any other data relevant to the management of the national public water works for water resources storage and flood control.

(2) The data shall be made available on the Water Storage Authority's website provided that a person requiring an extract of the data certified to be true from the Water Storage Authority's database shall make an application for it in writing and pay such reasonable costs as the Water Storage Authority may require.

(3) The request for data should be reasonable and relevant with respect to a specific activity and area.

(4) Data provided by the Water Storage Authority shall not be transferable to a third party and the Water Storage Authority shall not be liable for any error or omissions in the data.

40. The Cabinet Secretary shall, based on the information maintained pursuant to regulation 39(1), within twelve months of the coming into force of these Regulations and as required by the Climate Change Act, formulate and publicly disseminate an action plan and strategies to guide how climate change considerations shall be integrated in the management of water resources, including mitigation and adaptation actions, and the prevention and management of floods and other impacts of climate change.

Climate change action plan.
No. 11 of 2016.

41. The Authority shall regulate implementation of Integrated Flood Management Plans in all the flood prone areas by relevant state organs in collaboration with stakeholder groups.

Flood mitigation activities.

42. The Integrated Flood Management Plans shall be implemented through water resources users associations and other stakeholders in collaboration with county governments and in accordance with the guidelines issued by the Cabinet Secretary.

County governments and integrated flood management plans.

43. The Authority may require the development of check dams, green energy projects and dykes for purposes of flood mitigation.

Check dams, green energy, projects, dykes etc.

PART VIII—WATER HARVESTING

44. (1) The Cabinet Secretary shall, following public consultation, and on the basis of recommendations of the Water Storage Authority, gazette a Water Harvesting Policy and Strategy.

Water Harvesting Policy and Strategy.

(2) The Water Harvesting Policy and Strategy shall —

- (a) not be in conflict with the national water resource strategy;
- (b) set out the policy objectives, plans, guidelines and procedures and strategies for rainwater harvesting;
- (c) take into account any relevant national or regional plans;
- (d) outline mechanisms and procedures for collaborating with other institutions, both public and private, at national and county level to achieve the objectives of the policy and strategy;
- (e) put in place measures and incentives to enhance the adoption and implementation by the public of rainwater harvesting;
- (f) facilitate the provision of technical and capacity building support to public and private institutions at national and county level on rainwater harvesting techniques; and
- (g) be time bound.

(3) All state organs at national and county level shall give effect to any water harvesting policy made under this Part when exercising any power or performing any duty in terms of these Regulations.

(4) The construction of the water harvesting systems in all new institutional, commercial, public and open areas shall give effect to the water harvesting policy and be undertaken in accordance with the applicable county government planning and building regulations and all other applicable rules and regulations.

45. (1) Any building constructed after the commencement of these Regulations which is to be used —

Roof-based rainwater harvesting.

- (a) as an institutional facility, place of employment or otherwise;
- (b) as a manufacturing or industrial establishment; or
- (c) commercial establishment or place for the service of customers, shall have its roof adequately guttered for catching rain water or may have a ground catchment for the purposes of catching rainwater.

(2) Subject to sub regulation (3), the storage capacity of the tank or other storage facility in respect of any building referred to in sub regulation (1) shall be capable of storing water sufficient to meet the equivalent of seven days average water demand of the building.

(3) Where adequate reason is given to the county government in consultation with the Water Storage Authority to the effect that —

- (a) it is not practicable —
 - (i) to gutter the roof of a building mentioned in sub regulation (1) for catching rain water;
 - (ii) to provide a ground catchment having the prescribed area; or
 - (iii) to provide a tank or tanks having the prescribed capacity; and
- (b) the building can in the opinion of the county government or water services provider, be adequately supplied with drinking water from a main piped supply, the county government may, subject to such conditions and restrictions as it may think proper to impose, allow the owner or occupier of the building to dispense in part or in whole, compliance with sub regulation (1) or sub regulation (2).

(4) Roof based rainwater shall be harvested for use through a filter into a storage tank or subject to compliance with the water resource quality standards prescribed by the Authority, for recharge of an open well or borehole. In case of a borehole in a building, rainwater shall be harvested through artificial structures or pits, irrespective of the nature of subsoil conditions.

(5) Rainwater from the roof of a building such as tiled, sloped roof and flat roof may be collected using appropriate sized gutters or pipe lines and stored either in a collection tank or storage structure of appropriate size placed over the ground or underground after proper filtration and disinfection.

(6) An appropriate filter shall be used for filtering rain water and the water shall be used for non-potable purposes.

(7) The rainwater collected to be used for potable purposes by the owner or occupier shall be treated before use according to the Drinking Water Guidelines made by the Water Services Regulatory Board.

(8) Any surplus water available after filling a storage tank may be diverted to an open well through a recharge structure or a pit.

46. (1) A person may —

- (a) directly capture and store precipitation on a parcel of land owned or leased by that person in accordance with sub regulation (2); and

Land based
rainwater harvesting.

- (b) place the water captured and stored as provided in sub regulation (1)(a) to beneficial use on the parcel on which the water is captured and stored.

(2) Land based rain water harvesting shall be done using the appropriate ground water recharge structures or pits depending on the nature of the sub-soil conditions.

47. (1) The Water Storage Authority shall establish a website on which a person may register to receive technical and capacity building support from the Water Storage Authority or its agents to enable the person comply with these Regulations.

Technical and capacity building support.

(2) A person registering under sub regulation (1) shall furnish the Water Storage Authority with the following information —

- (a) name and address of the person capturing or storing precipitation;
- (b) total capacity of all containers storing precipitation; and
- (c) street address or other suitable description of the location where precipitation is to be captured and stored.

48. (1) An agricultural establishment using water resources for irrigation purposes shall implement water harvesting and storage measures capable of storing flood water sufficient to meet three months water demand.

Rainwater harvesting by agricultural establishments.

(2) An agricultural establishment using water resources for commercial irrigation shall submit to the Water Resources Authority a plan of water harvesting and storage strategies to be implemented.

(3) The Water Resources Authority or its agent may conduct an inspection to verify compliance with the implementation report.

49. County governments shall put in place measures to ensure that provision is made for planning, managing, maintaining, financing, extending and improving drainage services and storm water run-off collection within its area of jurisdiction.

Storm water run-off.

PART IX—LICENSING OF QUALIFIED PROFESSIONALS AND QUALIFIED CONTRACTORS IN RESPECT TO WATERWORKS

50. A water sector professional or dam contractor desiring to be licensed as a qualified water sector professional for storage dams or other waterworks or qualified dam contractor, if not already licensed under the applicable water resources regulations for the appropriate class of storage dam, shall apply in writing to the Cabinet Secretary for licensing.

Licensing of qualified water sector professional or approved dam contractor.

51. (1) The application referred to in regulation 50 shall be accompanied by —

- (a) a description of the class of waterworks and risk categories of the waterworks which the water sector professional or contractor wishes to be licensed in respect of; and

Application to be licensed qualified water sector professional of approved dam contractor.

- (b) particulars of the applicant's qualifications, training and experience.

(2) Before determining an application made under sub regulation (1), the Cabinet Secretary shall forward it to the Technical Advisory Committee established under the applicable Water Resources Regulations for consideration, except when the procedure provided for in sub regulation (5) is followed.

(3) The Technical Advisory Committee may recommend an application under sub regulation (1) —

- (a) for approval by the Cabinet Secretary subject to conditions if there are limited shortcomings in the relevant skills, and experience on the specific storage dams or other waterworks construction, engineering, design, operation and management; or
- (b) for rejection if substantial weaknesses are evident.

(4) The Cabinet Secretary shall take into account the recommendations made by the Technical Advisory Committee before granting an approval or rejecting an application made under sub regulation (1).

(5) The Cabinet Secretary may approve an application by a qualified water sector professional for any task with a safety risk, taking into account the recommendation by the Technical Advisory Committee, provided that —

- (a) the type of dam is the same, or can be logically associated with a similar category or combination of dam types, for which the applicant has been previously approved;
- (b) the maximum wall height of the dam as defined in these Regulations does not exceed that for which the applicant has been previously licensed by more than —
 - (i) three metres in the case of Class SD1 dams;
 - (ii) five meters in the case of Class SD2 dams; and
 - (iii) fifteen meters in the case of Class SD3 dam.

(6) The Cabinet Secretary may also approve an application for any specific task if the task is, in the opinion of the Cabinet Secretary on the basis of the recommendation of the Technical Advisory Committee, no more complex than that for which the applicant has previously been approved as a qualified water sector professional.

(7) In the case of tasks to be carried out for a Class SD3 dam, a qualified water sector professional shall apply to the Cabinet Secretary for approval of members of the professional team and provide the names, qualifications, curriculum vitae, relevant professional experience and description of each component of the task entrusted to each team member.

(8) The water sector professional or qualified contractor shall be informed in writing of any decision of the Cabinet Secretary.

(9) A professional contemplated under sub regulation (1) shall —

- (a) inform the dam owner of the decision of the Cabinet Secretary whether the application has been approved, conditionally approved or not approved;
- (b) apply to the Cabinet Secretary for approval of a person or group of persons to assist him or her in the specified field of dam engineering if the approval is subject to conditions requiring assistance; and
- (c) immediately inform the Cabinet Secretary in writing if he or she has withdrawn from a task or if his or her appointment has been terminated by the dam owner.

(10) An application under sub regulation (9) (b) shall include the name, qualifications, curriculum vitae and relevant experience of the person or group of persons providing assistance.

(11) The different categories of qualified professionals and contractors shall be as provided in Table 3 and Table 4 in the Second Schedule and by taking note of factors such as the maximum wall height of the dam, type of dam wall, regional maximum flood or type of task that the approved professional person may undertake.

(12) The requirements for admission to a class of approved water sector professional on the register are the same as those for regulating the approval of a professional person as a qualified water sector professional for a specific task, with the additional requirement that a water sector professional shall have successfully completed at least one task for a specific dam as the qualified water sector professional in accordance with these Regulations.

(13) The Cabinet Secretary shall maintain two separate registers for qualified water sector professionals and qualified dam contractors in accordance with the applicable Regulations.

(14) The registers under sub regulation (13) shall be published annually in the *Gazette* and shall be made available within reasonable time to any person who has made a written request to the Cabinet Secretary for a copy of the register.

(15) A qualified water sector professional on the register may undertake tasks as provided in the register without having to reapply.

(16) A qualified water sector professional on the register may only perform a task or tasks within the class for which he or she has been approved and shall —

- (a) follow the procedure set out in regulation 10 (6) for tasks related to Class SD3 dams if applicable;
- (b) follow the procedure set out in regulation 10 (3) in the case of conditional approval; and
- (c) submit a copy of the licence issued by the Cabinet Secretary

to the Water Resources Authority for its records, and a written confirmation from the dam owner confirming that he or she has been licenced to perform a specific task, within seven days of the licence being issued.

PART X— GENERAL PROVISIONS

52. Any breach of the provisions of these Regulations shall — Offences.

- (a) constitute an offence, punishable in accordance with the provisions of section 147 of the Act; and
- (b) constitute a reason for suspension or cancellation of the permit or other authorisation held by the owner or operator of the storage dam or waterworks.

53. (1) No person may use any works otherwise than as permitted under the Act or these Regulations. Other offences.

(2) For the avoidance of doubt, a person who —

- (a) fails to comply with any condition attached to the operation and maintenance of waterworks for water resources storage and flood control under the Act and these Regulations;
- (b) fails to comply with an order or directive issued under the Act and these Regulations and unlawfully and intentionally or negligently tampers or interferes with any works, any seal or measuring device attached to a waterworks for water resources storage and flood control;
- (c) fails or refuses to give data or information, or gives false or misleading data or information when required to give information under the Act;
- (d) intentionally refuses to perform a duty or obstructs any other person in the exercise of any power or performance of any of that person's duties in terms of the Act and these Regulations;
- (e) unlawfully and intentionally or negligently commits any act or omission which detrimentally affects or is likely to effect a waterworks for water resources storage and flood control,

commits an offence and is liable on conviction, to the penalties prescribed under section 147 of the Act.

54. (1) Any person with a complaint related to any matter falling within the mandate of the Water Storage Authority shall submit the complaint to the appropriate office of the Water Storage Authority by providing the details shown in the Fifth Schedule. Complaints mechanism.

(2) The Water Storage Authority shall reply to the complainant, with copies to all other relevant parties, within twenty-one days of receiving the complaint, stating what action is being taken, the position of the Water Storage Authority on the matter or any recommendation to the complainant.

(3) If the complainant is dissatisfied, he or she may forward the matter to the Chief Executive Officer of the Water Storage Authority.

(4) The Chief Executive Officer shall respond to the complainant by upholding or overruling the action taken or decision made by the agent or officer within twenty-one days of receiving the complaint and the Chief Executive Officer shall furnish copies of the decision to all other relevant parties.

(5) If the complainant is dissatisfied with the decision of the Chief Executive Officer or if the Chief Executive Officer fails to communicate his or her decision to the complainant within twenty-one days, the person may have recourse under section 121 (2) of the Act and may forward the matter to the Water Tribunal for determination

(6) Each complaint shall be given a complaint number by the Water Storage Authority which shall be used for purposes of monitoring the response and action taken to address the complaint.

55. (1) Construction of works by the Water Storage Authority or its agent prior to the commencement of these Regulations or construction work in progress on that date shall within a period of twelve months following the commencement of the Regulations or such longer period as the Authority may permit take measures to bring the waterworks into compliance with these Regulations.

Transitional
arrangements.

(2) Where existing or ongoing waterworks are not authorised, the owner or operator shall within a period of twelve months following the commencement of the Regulations lodge an application with the Authority for a water use permit.

FIRST SCHEDULE

r4 (1), 7(1), 10 (1))

CLASSIFICATION OF STORAGE DAMS

Table 1: Classification of Storage Dams

<i>Class of Dam</i>	<i>Maximum Depth of Water at NWL (m)</i>	<i>Impoundment at NWL (m³)</i>	<i>Catchment Area (km²)</i>
SD1	0 – 4.99	< 100,000	< 100
SD2	5.00 – 14.99	100,000 to 1,000,000	100 to 1,000
SD3	≥ 15.00	> 1,000,000	> 1,000

NWL = Normal Water Level

SECOND SCHEDULE

(r 4 (1) , 6(1) , 10(3)(a), 11(1), 15(c), 22, 23(1), 33(1), 51(1))

RISK FACTORS OF STORAGE DAMS AND OTHER WATERWORKS

Table 2: Risk Factors

Classification	Population at Risk	Incremental Consequences of Failure		
		Loss of Life	Environmental and cultural values	Infrastructure, economics and other property
SD 1 (Low Risk)	Temporary/ Permanent	Minimal numbers	Limited presence of: (a) important fisheries (b) important wildlife habitats (c) rare or endangered species, or (d) unique landscapes (e) sites of cultural Significance and additionally Restoration or compensation in kind for losses and damage is possible.	Low economic losses affecting limited infrastructure and residential buildings, public transportation or services or commercial facilities; alternatively limited destruction or damage to locations used occasionally and irregularly for temporary purposes.
SD 2 (Medium Risk)	Permanent	Significant numbers	Significant presence: (a) critical fisheries; (b) critical wildlife habitats; (c) rare or endangered species, or (d) unique landscapes (e) sites of cultural	Moderate economic losses affecting important infrastructure, public transportation or services or commercial facilities, or moderate destruction or severe damage to residential

			significance and additionally Restoration or compensation in kind for losses and damage difficult.	areas.
SD 3 (High Risk)	Permanent	Large numbers	Presence of : (a) critical fisheries; (b) critical wildlife habitats; (c) rare or endangered species, or (d) unique landscapes (e) sites of cultural significance and additionally Restoration or compensation in kind for losses and damages is impossible or impracticable.	High economic losses affecting critical infrastructure, public transportation or services or commercial facilities, or significant destruction or damage to residential areas.

Table 3: *Design and Supervision of Dam*

<i>Class of Dam</i>	<i>Category of Qualified Water Professional</i>
SD1	Panel II C, Panel I C1 & Panel I C2
SD2	Panel I C1 & Panel I C2
SD3	Panel I C2

Table 4: *Category of Dam Contractor*

<i>Class of Dam</i>	<i>Category of Dam Contractor</i>
SD1	C1, C2
SD2	C1, C2
SD3	C1

Table 5: *Minimum Return Period for Spillway Design*

<i>Class of Dam</i>	<i>Minimum Return Period for Design of Spillway</i>
SD1	1 in 50 years
SD2	1 in 100 years
SD3	1 in 500 years

Table 6: *Dam Safety Inspection Schedule*

<i>Class of Dam</i>	<i>Frequency of inspection</i>	<i>Inspection by</i>
SD1	Once in 3 years	Panel I C1, Panel I C2, Panel II C
SD2	Once in 2 years	Panel I C2, Panel I C1
SD3	Once a year	Panel I C2

THIRD SCHEDULE

(r 11(2), r 12(2), 14(1), 20(1), 21(1), 33(1), 34(1))

CONTENT AND FORMAT OF TECHNICAL REPORTS

The following technical reports shall substantially provide the details required.

DAM DESIGN REPORT (FOR CLASS SD1, SD2 AND SD3 DAMS)

<i>Item</i>	<i>Contents</i>
1.	Details of location
2.	Details of hydrological assessment
3.	Details of design flood and return period
4.	Details of embankment
5.	Details of reservoir
6.	Details of draw-off and compensation works
7.	Details of spillway(s)
8.	Details of ancillary structures
9.	Details of construction materials
10.	Details of construction schedule
11.	Details of operational rules
12.	Procedures to notify and protect downstream inhabitants, infrastructure and environments
13.	Schedule of inspection and maintenance
14.	Assessment of impacts and risks

DAM OPERATION REPORT

<i>Item</i>	<i>Contents</i>
1.	Basic summary of technical details
2.	Details of management structure for dam operations
3.	Details of operational and release rules
4.	Details of operation and maintenance systems
5.	Procedures to notify and protect downstream inhabitants, infrastructure and environments
6.	Schedule of inspection and maintenance

DAM COMPLETION REPORT

<i>Item</i>	<i>Contents</i>
1.	Changes and explanation for differences between as-constructed and design details
2.	As-constructed drawings
3.	Summary of as-constructed details

DAM INSPECTION REPORT

<i>Item</i>	<i>Contents</i>
1.	Current condition of dam with respect to approved design and "as-constructed" condition
2.	Any action required to restore the functional and structural integrity of the dam to the required state
3.	Any changes with regard to the risk of or impact in the event of dam failure

DAM DAMAGE OR FAILURE REPORT

<i>Item</i>	<i>Contents</i>
1.	Details of location
2.	Date and time of dam failure or damage
3.	Preceding climate
4.	Preceding hydrology
5.	Cause of dam failure or damage
6.	Steps taken to notify downstream inhabitants
7.	Nature and extent of damage caused to the dam or caused by the dam failure

FOURTH SCHEDULE

(r. 17(1))

PREMIUMS FOR USE OF WATER FROM A REGULATED WATERCOURSE ETC

In the case of a permit to abstract or divert water from a regulated river, a premium shall be paid by the water user which shall be calculated using the formula herein:

$$K = \frac{(O \& M) \times 20\% \times \text{allocation to individual water user in MCM/year}}{\text{Annual Design Yield of Storage Dam in MCM/year}} = \text{Kshs per year}$$

Where:

1. (O&M) is the Water Storage Authority's operation and maintenance costs of the dam releasing the water into the natural watercourse from which the abstraction or diversion occurs.
2. The allocation to individual water user is the water allocated by the permit to the individual water user in cubic metres per year.
3. Annual design yield is the design yield of the storage dam releasing into the regulated river in cubic metres per year.
4. The formula provides the basis for deriving the amount payable by the water user as a premium.

FIFTH SCHEDULE

(r 54(1))

COMPLAINTS

INFORMATION TO BE GIVEN BY COMPLAINANT UNDER THESE RULES

<i>Item</i>	<i>Information</i>
(a)	Name of Complainant
(b)	Contact address, telephone number, email address (if any) of Complainant
(c)	Nature and location of the problem
(d)	Date that problem occurred
(e)	Name and, if available, the contact details of all parties to the dispute or complaint
(f)	Any other relevant details
(g)	Signature of the Complainant

Dated the 7th July, 2021.

SICILY K. KARIUKI,
Cabinet Secretary for Water and Sanitation and Irrigation.