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LAWS OF KENYA

**THE KIKUYU SPRINGS AQUIFER GROUNDWATER
CONSERVATION AREA MANAGEMENT ORDER**

NO. 208 OF 2021

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Kenya

Water Act

The Kikuyu Springs Aquifer Groundwater Conservation Area Management Order

Legal Notice 208 of 2021

Legislation as at 31 December 2022

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The Kikuyu Springs Aquifer Groundwater Conservation Area Management Order (Legal Notice 208 of 2021)

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WATER ACT

THE KIKUYU SPRINGS AQUIFER GROUNDWATER CONSERVATION AREA MANAGEMENT ORDER

LEGAL NOTICE 208 OF 2021

Commenced on 14 October 2021

[Revised by [24th Annual Supplement \(Legal Notice 221 of 2023\)](#) on 31 December 2022]

1. Citation

This Order may be cited as the Kikuyu Springs Aquifer Groundwater Conservation Area Management Order.

2. Interpretation

In this Order, unless the context otherwise requires—

"Act" means the Water Act (Cap. 372);

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

"aquifer" means an underground geological formation able to store and yield water; and

"Kikuyu Springs Aquifer Groundwater Conservation Area Management Guidelines" means the protection and conservation guidelines as published by the Authority in respect of Kikuyu Springs Aquifer Groundwater Conservation Area.

3. Declaration of Protected Area

- (1) The Kikuyu Springs Aquifer Groundwater Conservation Area is declared to be a protected area for the purposes of the Act.
- (2) The boundary for the Kikuyu Springs Aquifer Groundwater Conservation Area is as set out in the First Schedule.

4. Management Guidelines

The Kikuyu Springs Aquifer Groundwater Conservation Area Management Guidelines under the Second Schedule shall come into effect upon publication of this Order and shall be the basis for conservation of the water resources within the Kikuyu Springs Aquifer Groundwater Conservation Area.

5. Public Notices

- (1) The Authority shall place signboards and beacons in or near the water resource or in appropriate public places frequented by water users and at the Authority's offices to display up-to-date information about the condition of the water resources of the Kikuyu Springs Aquifer Groundwater Conservation Area.
- (2) The public notices shall contain information regarding the action required of water users to conserve and protect the water resources of the protected area.

6. Offences

Any person who contravenes this Order commits an offence and is liable upon conviction to a fine of one hundred thousand shillings or imprisonment for a term not exceeding one year, or both such fine and imprisonment.

FIRST SCHEDULE [p. 3(2)]

BOUNDARY FOR THE KIKUYU SPRINGS GROUNDWATER CONSERVATION AREA BOUNDARY

BOUNDARY	SPECIFIC POSITION OF THE BOUNDARY	UTM X	UTM Y
NORTHERN	NORTH TOP SIDE	237300	9888500
NORTHERN	NORTH EASTERN	237000	9888400
WESTERN	NORTH WEST(UPPER SIDE) Western Boundary	235500	9886700
WESTERN	Middle West	235600	9882700
WESTERN	Middle West(Near Bibirioni)	235500	9881000
WESTERN	On E430 Road(Western Boundary)	234600	9879300
WESTERN	On A104 Road (200m after Ngenia Road and A 104 Junction)	234700	9879300
SOUTHERN	A104 (Southern Boundary)	236500	9874700
SOUTHERN	D 407	238000	9874800
EASTERN	Tunnel(Eastern Boundary) Headwaters of Ithanji River	238000	9875800

EASTERN	Half kilometer from Limuru Town-Headwaters of Tigoni River	238200	9877000
EASTERN		238500	9879200
EASTERN		238700	9881500
EASTERN		239300	9883200
EASTERN	UPLANDS TOWN IS ON THE WEST	239150	9884700
EASTERN		239100	9886800
EASTERN		239400	9887000

SECOND SCHEDULE [p. 4]

MANAGEMENT GUIDELINES FOR KIKUYU SPRINGS AQUIFER GROUNDWATER CONSERVATION AREA



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MINISTRY OF WATER AND SANITATION



WATER RESOURCES AUTHORITY

This document was prepared through a consultative process involving area Water Resource Users Associations (WRUA), Members of Parliament, the County Government of Kiambu and other stakeholders, spearheaded by WRA under the stewardship of Dan Otero, Consulting Hydrogeologist

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LIST OF ACRONYMS Abbreviation/Acronym Meaning

GCA Groundwater Conservation Area

WRA Water Resources Authority

WRMA Water Resources Management Authority

WRM Rules, 2007 Water Resources Management Rules, 2007

NEMA National Environment Management Authority

KIKUYU SPRINGS AQUIFER GROUNDWATER CONSERVATION AREA MANAGEMENT GUIDELINES

PREAMBLE

The Water Resources Management Authority (WRMA) was established under the Water Act, 2002 (Repealed) as a State Corporation under the Ministry of Water and Irrigation. WRMA has been in existence since 2005 following its establishment. In order to harmonize functions and mandates as contemplated under the Constitution of Kenya, 2010, the Water Act (Cap. 372), was established and operationalized.

Water Resources Authority (WRA) is established under Section 11 of the Water Act (Cap. 372). Pursuant to Section 6 of the Act, the Authority is an agent of the National Government responsible for regulating the management and use of water resources. WRA was operationalized on 21st of April, 2017 vide *Gazette Notice No. 59*.

These management guidelines were prepared by the Water Resources Authority after extensive stakeholder consultations from the Groundwater Conservation Area (GCA), including water users, area Members of Parliament, Members of County Assembly and other institutions. The GCA is established in accordance with the Water Act (Cap. 372) Section 23(2) and the Water Resources Management Rules, 2007 (with amendments in 2012).

The Water Resources Management Rules, 2007 outline the process of identifying areas to be designated as groundwater protection and conservation areas. Part XI Rule 123(1) states that:

Pursuant to Sections 23(1) and (2) of the Water Act (Cap. 372), where the Authority is satisfied that in any area special measures for the conservation of groundwater are necessary in the public interest it may declare the area to be a groundwater conservation area. The Authority may also impose such requirements or prohibit such conduct or activities in relation to a groundwater conservation area as it may consider necessary for the conservation of the groundwater.

Part D of the Sixth Schedule of the Water Resources Management Rules 2007 sets out the contents of management rules or plans related to a protected area or groundwater conservation area and may include:

- (a) Procedures to be applied for the management of the Protected Area or Groundwater Conservation Area;
- (b) Prohibited activities;
- (c) Any measures required to be undertaken for water resource conservation and protection;
- (d) The timeframe for implementation of required measures;
- (e) Any other conditions that the Authority may consider relevant

This document presents the management procedures and prohibited activities in the Kikuyu Springs Aquifer GCA.

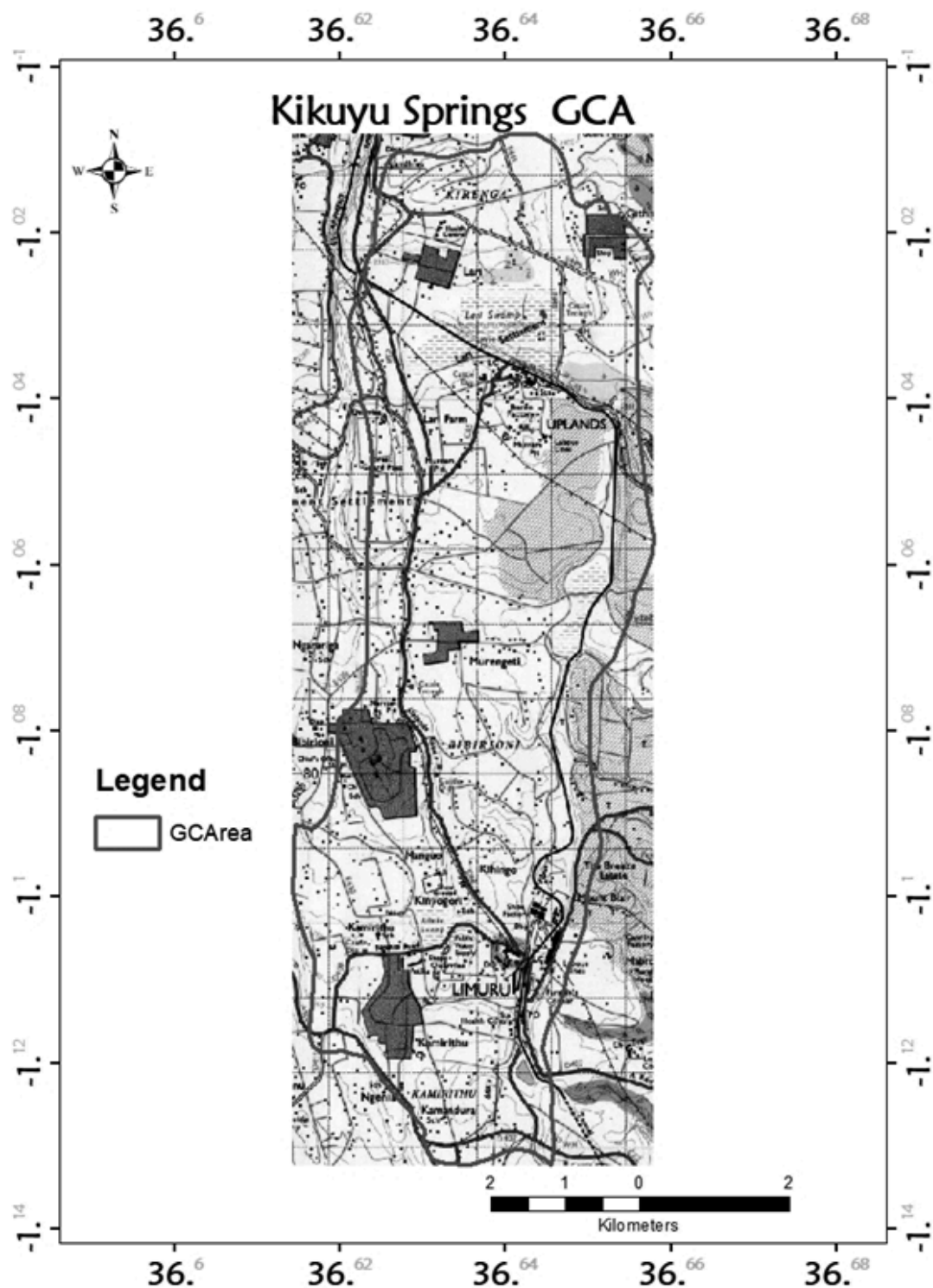
Extent of the Groundwater Conservation Area

For ease of identification of boundaries, the southern edge of the GCA is to run west from the railway tunnel south of Limuru along the road D407 and then join road A104 near Kamandura Primary School,

leave road A104 to join D409 (Ngenia Road) then cross to E430 before Kamirithu. It then leaves E430 and

turns north along the top of the escarpment east of Ngarariga Primary School. At Kirenga the boundary turns east along the road heading to Bathi River.

The boundary then turns southwards along the watershed to Githirioni where it runs on the escarpment along the railway line past Uplands all the way down through Limuru and joins back on Road D407 at the end of the railway tunnel (Map 1).



Map 1. Groundwater Conservation Area (GCA) for the Kikuyu Springs Aquifer

OBJECTIVE

The objective of the GCA guidelines is to provide a framework under which groundwater use within the conservation area will be undertaken in a manner such that the desired future condition of the resource is fulfilled.

more than the 25% tested yield from each borehole into the aquifer in the Water Allocation Guidelines published by WRA for safe yield and way over the 10% of mean annual recharge sustainable groundwater yield adopted for the National Water Master Plan 2030. Fortunately, subsurface inflow from outside the catchment provides an estimated 4.1 - 5.6 MCM, which, if added to the annual recharge reduces the proportion of abstraction to between 48 and 52% of the total aquifer recharge.

These data make it clear that the aquifer is on the verge of overexploitation and certainly under pressure. This rate of abstraction and its increase is not sustainable in the long run. The effect of the increasing abstraction is seen in the deteriorating water quality as exemplified by time series data that show increasing mineralization of groundwater with time, on a linear trend. It is indicated that this state of affairs is not unique to the Kikuyu Springs aquifer: the Nairobi Aquifer Suite as a whole is under threat of overabstraction.

The desired future condition must provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater in the Conservation area.

Consequently, the desired future condition of the GCA is summed as follows:

- Groundwater quality remains potable by Kenyan Standards (KEBS: KS 05-459: Part 1: 1996);
- Annual renewable groundwater recharge is sustained at or over the year 2012 level, subject to climate change effects;
- Annual groundwater abstraction does not exceed 70% of the total aquifer recharge.
- Artesian pressure is maintained at a level that can sustain Ondiri Swamp and Kikuyu Springs.
- Other groundwater dependent ecosystems, here identified as wetlands, are protected.

To achieve these targets, guidelines on the following aspects of groundwater use and conservation are required:

- a). Abstraction limits;
- b). Water use prioritization; c). Borehole construction; d). Groundwater recharge;
- e). Groundwater monitoring;
- f). Water allocation;
- g). Pollution control;
- h). Enforcement.

1. MANAGEMENT GUIDELINES

2.1 Abstraction Limits

2.1.1 Maximum allowable production

To minimize as far as practicable the drawdown of the water table and the reduction of artesian pressure, to prevent interference between boreholes, to prevent degradation of water quality, to address the potential loss of opportunity to drill a new borehole because of spacing requirements, and to prevent waste the following guidelines shall apply in the GCA to regulate the production of groundwater.

(a) Availability goal

The Water Allocation Guidelines provide for 25% of the tested yield over a 24 hr period, or 60% of the tested yield over a 10-hour period as the maximum allowable production as a general WRM rule. This shall continue to apply in the GCA as it does in all groundwater systems.

(b) Permitting goal

To minimize wastage and diversion of water to other uses, and to address the potential loss of opportunity to access groundwater, the permitting goal is to match the permitted amount with the applied use. Therefore permitted amounts will be based on the per capita water requirements set out in the Design Manual as reproduced in the Water Allocation Guidelines.

Based on these standards, the maximum permitted amount for domestic use for example is 1.5 m³/day for a household of 6. In the typical situation, domestic permits are up to 10 m³/day which is not utilized in full or is diverted to other uses, thereby denying other users access to their water rights. WRA shall therefore make reasonable effort to not grant permit applications for more water production than is actually needed for beneficial use.

(c) Reconciliation of water use

Water use charges that apply will be reconciled with the production against the permitted limit. Where actual water use consistently falls to 40% or less of permitted amount for one year, WRA is at liberty to review the permitted amount downwards.

Where the abstraction is consistently at least 105% or more of the permitted amount for one year the water user will, along with infringement penalties specified in the WRM Rules, be subject to specific penalties that shall apply to Groundwater Conservation Areas as shall be specified in the WRM Rules.

1.1.2 Exclusions and exemptions

(a) Historic use

Historic or existing groundwater use in the GCA before the effective date of the GCA management guidelines shall be preserved, to the maximum extent practicable, consistent with WRM Rules. Historic use of groundwater may only be preserved for the actual use of the water from the Kikuyu Spring Aquifer, and cannot be transferred to a different use and may not be withdrawn from a different aquifer. Therefore, changes in abstraction and use of groundwater under a historic use operating permit may not be made without prior approval of WRA, and such changes will jeopardize the historic use preservation. Evidence of historic use must be presented to WRA before such use may be preserved. Whenever preserved, such use will be regularized by WRA to reflect the new situation under the GCA guidelines.

1.1.3 Transfer of groundwater out of the GCA (a) Permit required

Groundwater produced from a borehole within the GCA may not be transported outside the GCA boundaries unless the operator has been issued a transfer permit under Rule 48 of WRM rules 2007. This is to ensure that any water in the aquifer should be used within the conservation area.

(b) Applicability

- i. A person proposing to transport groundwater out of the GCA must obtain a transfer permit, in addition to an abstraction permit for a new borehole, or a transfer permit for an existing one to transfer groundwater out of the GCA.
- ii. A transfer permit for the transportation of water outside the GCA is not required for the transportation of groundwater that is part of a manufactured product, or the groundwater is to be used on property that straddles the GCA boundary line, or the groundwater is used within the existing contiguous service area of an existing retail public utility that straddles the GCA boundary line.

2.2 Borehole Siting in GCA

Siting of boreholes in the GCA shall be subject to all provisions of the Codes of Practice for Borehole Siting, with particular regard to Environmental Considerations ([Section 5.2](#)). Further to this, particular emphasis shall be laid to investigation methods (5.4), which shall include an exhaustive inventory of existing data, including all existing groundwater abstraction in the neighborhood of the current application without exception. The investigating geologist/ hydrogeologist shall

demonstrate in the report that this has been exhaustively done for the Technical Evaluation Committee to consider granting the authorisation to drill.

Conditions for drilling the borehole, including limits to abstraction and mandatory borehole design considerations shall be stated by the siting geologist/hydrogeologist in his/her recommendations.

In the case of new developments from Kikuyu Springs Groundwater Conservation Area, the geologist/hydrogeologist's report will include water balance before and after the proposed development.

- (a) An application for major development within the GCA shall be accompanied by an environmental impact study that demonstrates that the quality and quantity of groundwater in the GCA and the recharge function of the area will be protected, improved or restored.
- (b) Groundwater use applications that promote storm water management and infiltration will be given priority in granting of authorisations to drill within the GCA. Such plans shall be subject to approval so that they do not pose groundwater contamination risk.

2.3 Borehole Construction

These guidelines are complementary to the Codes of Practice for Construction of Boreholes and should be read in conjunction with the following documents:

- The Water Resources Management Rules, 2007
- The Code of Practice for the Siting of Boreholes
- The Code of Practice for the Supervision of Construction of Boreholes
- The Code of Practice for the Test Pumping of Boreholes
- The Water Allocation Guidelines (2010)

2.3.1 Spacing requirements

- (a) To minimize as far as practicable the drawdown of the water table and the reduction of artesian pressure, to prevent interference between boreholes and to prevent degradation of water quality the Water Resources Management Authority will enforce spacing requirements on all new boreholes in the GCA. These will be in accordance with the spacing guidelines outlined in the Section 4.4 of the Water Allocation Guidelines (2010).
- (b) Spacing requirements in the GCA do not apply to manually-dug large diameter wells abstracted by windlass or such traditional systems.
- (c) In the case of a municipal well field, WRA may waive the spacing requirements on the well field if the applicant submits adequate evidence showing that the increased cone of depression caused by the well field will not increase the impact on nearby existing wells. This calls for, *inter alia*, appropriately designed pumping tests and well field layout design.

2.3.2 Sanitary seal

The minimum depth of the sanitary seal in boreholes in the GCA shall be 6 metres; the area is a high-recharge area that has high linear transmissivity along the numerous fault zones. It also has thick soils that may be subject to piping thereby increasing the risk for groundwater contamination.

2.3.3 Unsuccessful boreholes

Abandoning of unsuccessful boreholes shall be in accordance with the Codes of Practice for Borehole Construction. In addition to backfilling, an abandoned borehole in the GCA shall be sealed in the top 6 metres to ground level with bentonite.

2.4 Pollution Control

These guidelines shall be read in conjunction with the provisions of the Water Act (Cap. 372), WRM Rules, 2007 and such other subsidiary legislations as may be put in place from time to time in respect to Water Quality and Pollution Control.

Due to the need to prevent pollution in the GCA, upon inspection, WRA may provide notice to affected parties and issue orders to prevent pollution. If WRA determines that an emergency situation exists, a temporary order to prohibit pollution and protect public health, safety and welfare shall be issued without notice. The order shall continue in effect for the lesser of fifteen (15) days or until tests are done.

2. EXEMPT AND PROHIBITED ACTIVITIES

3.1 Exempt Activities

The following activities are exempt from the GCA requirements:

1. All residential uses and activities;
2. Other uses not listed as prohibited;
3. Activities already permitted and regulated by the Water Resources Management Rules (e.g., historic water use).

3.2 Prohibited Activities

The following activities are considered high-impact uses due to the probability and/or potential magnitude of their adverse effects on groundwater and shall be prohibited in the GCA:

- A. Landfills;
- B. Large capacity septic systems (serving multiple dwellings or non-residential establishment of 20 or more persons per day); examples include apartment buildings, schools, religious institutions, office, industrial and commercial buildings, shopping malls, train and bus stations, hotels & restaurants, casinos;
- C. Commercial activities that are not connected to an available sanitary sewer system;
- D. Agricultural drainage wells (receive irrigation tail waters, other field drainage, animal yard, feedlot, or dairy runoff);
- E. Untreated sewage waste disposal wells;
- F. Cesspools (serving multiple dwelling or institutions, or other devices that receive wastes and which must have an open bottom and sometimes have perforated sides); note that many 'septic' tanks are actually cesspools due to design;
- G. Industrial process water and disposal wells;
- H. Motor vehicle waste disposal wells (surface effluent from service stations); I. Surface mining operations.
- J. Activities that would significantly reduce the recharge to aquifers; K. Radioactive waste disposal sites;

3.3 Enforcement

The enforcement of management guidelines and prohibitions shall be in accordance with provisions of the Water Resources Management Rules 2007 as established by the Water Act, 2002 (Repealed).

These shall include, *inter alia*, PART VIII - Water Use Charges, entails and additional five per cent to the water use charges.

The itemized prohibited activities shall be notified to the National Environment Management Authority (NEMA), the physical planning department and the public works department in each county affected by the GCA through the gazette notice.

3. GROUNDWATER CONSERVATION MEASURES

4.1 Conservation activities

The following activities will be undertaken to roll out the conservation plan postgazettement—

1. Public awareness campaigns following Gazettement of the GCA.
2. Reconciliation of the water permit database for the GCA with the actual abstraction points to ensure all existing groundwater abstractions are authorized.
3. Reconciliation of water use with the permit database to capture the actual abstraction against the permitted abstraction.
4. Review of permits to equitably match water needs with the permitted abstraction. A moratorium shall be declared for those found to be over-abstracting and their permits regularized to reflect the actual abstraction conditions, as long as the reviewed water use limit has been assessed positively and the permit revised accordingly.
5. Review of the (Technical Reports) contents of Hydrogeological Assessment Report for borehole siting in the GCA to include specific requirements for conservation areas. The revised rules will give reporting guidance to include definitions of the recharge/discharge conditions, identify groundwater/surface water interactions, characterize vulnerability to contamination, and provide a pre-to-post project water balance analysis and recommendation of appropriate mitigation measures.
6. Coordination with the County physical planning, agriculture, water, sanitation departments and NEMA to highlight GCA management guidelines and technical advice on County by-laws where required.
7. Installation of dedicated monitoring wells for the various aquifer levels in the GCA.
8. Enforcement of WRM Rules and GCA management guidelines.

4.2 Conservation plan

Activity	Tool	Implementer	Stakeholders	Start Date	End Date
Public awareness	<i>Gazette</i> Notice; GCA guidelines both full and abridged version	WRA NairobiSub-Region	WRA HQ, RO, Water Users, County of Kiambu	Upon gazettement	3 months after
Reconciliation of water permit database	PDB, Borehole Database, field inventory (In case of incomplete database)	WRA NairobiSub-Region	WRA HQ, RO	Upon gazettement	3 months after

Reconciliation of water use with permit database	Water use charges; abstraction survey	WRA NairobiSub-Region	WRA HQ, RO, Water Users	3 months after gazettelement	9 months after gazettelement
Review of existing permits	Abstraction survey data; Updated PDB	WRA NairobiSub-Region	WRA HQ, RO, Water Users	9 months after gazettelement	12 months after gazettelement
Review of Hydrogeological Report Contents in WRM Rules	GCA Management Guidelines; Legislative Amendment	Ministry of Water and Sanitation	WRA HQ; Consulting Hydrogeologists/ Geological Society of Kenya	Upon gazettelement	12 months after gazettelement
Coordination with the County physical planning, agriculture, water, sanitation departments and NEMA	GCA Management Guidelines, County bylaws	WRA NairobiSub-Region	WRA HQ, RO, County of Kiambu, NEMA	Ongoing process	Ongoing process
Installation of dedicated monitoring wells	Aquifer map; construction program	WRA NairobiSub-Region	WRA HQ, RO, Water Users	Upon gazettelement	24 months after gazettelement
Enforcement	Water Act (Cap. 372), WRM Rules, 2007, GCA management guidelines, Athi Basin Management	WRA NairobiSub-Region	WRA HQ, RO, Water Users, County of Kiambu	UponGazettelement	Ongoing process

Activity	Tool	Implementer	Stakeholders	Start Date	End Date
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	Strategy, County bylaws, Environment al Management & Coordination Act 1999; Physical Planning Act				
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4.3 Funding the Conservation plan

For the groundwater conservation plan to succeed, financial resources are required. WRA HQ has the sole responsibility of raising the resources through budgetary allocation from the Ministry of Water and Sanitation, own revenue and cooperation with stakeholders.