Minutes

Meeting	Equity	**Meeting Reference Number:**	Equity_06072022
Date:	06 July 2022	**Time:**	0900 hrs EAT
Venue:	Equity Center, Upper Hill	**Minutes prepared by:**	Tollander

Invitees	Title/Designation
1. Edwin Oluoch	Senior relationship manager, Institutions and Public Sector banking
2. Ishmael Karani	Relationship manager, Corporate and Public Sector Banking
3. Kimura Kazunari	JICA
4. Shibata Satoko	JICA
5. Tollander Wabwire	JICA

Absent with apologies

Invitees	Title/Designation
1. NA	N/A

Purpose: Bank's opinions on bankability based on shared teasers

Ishmael: What channels do they use to collect?

> We need the accounts to be held with us for visibility and comfort.
> Equity has a foundation that deals with environmental sustainability projects (including solar panels). We are likely to link a project featuring solar panels to our experts on the Foundation side. The team agreed to share a contact if there is a need to access the Foundation at a later point.

Teaser 1: Turn-over/month about 78 million.

Edwin: We depend on regular revenues when assessing financials, but there are scenarios where the WSPs get donations, grants, and subsidies. e.g., WSTF grants may have featured in the cash flows of WSPs who participated in the OBA Program. We do isolate such and compute turn-over less such grants.

Kazunari clarified, that the 936 million revenues for this case did not include grants.

Edwin: We also look at O&M, and bank statements (historical), i.e., purely cash-flow lending.

Ishmael: We can extend the lending period to between 5-10 years and use cash-flow lending as a work-around for collateral.

Edwin: The Bank would be fine if a WSP could make repayments based on their cash flow.

Water.org has a project where they want to pick 6 WSPs. KfW wants to pick 5-6, under their AOD Program while JICA wants to identify and work with 5. There is a need for some coordination on how this gets done in this ecosystem.

Don't just pick the top (by WASREB rated). Consider weak ones and bring them up to speed.

On Bankability of Teaser 1, with 936 million in revenues, is good, and the solar element is good as it goes towards the reduction of energy costs.

Ishmael thinks that this is a good project. Can be a flagship/model project that can involve the Foundation's work on solar equipment and related capacity support.

Interest rates are regulated, so not much can be done on that front, but based on our internal assessments, we can re-assess based on future income flows of the WSP.

Public Finance Management Act, 2016 requires that approvals for borrowing be obtained from respective Counties, then through National Treasury.

Edwin: Banks take collateral as a psychological element [There is a legal requirement to secure or make provisions for bad debts for every doubtful loan, whether secured or not.

We are happy to do cash flows.

Teaser A-2

Project good.

We can still accommodate this.

A three-year grace period to overhaul meters may be too long. It may need procuring (90 days), and another short period for installation.

According to CBK, you can lend up to 25% of total holdings. Equity can lend up to 40 billion to a single obligor. There is a lot of liquidity that sits in, so amounts are not an issue. (1.03 trillion Asset size. Widest branch network, including agencies)

So, cash flows are critical. The problem is are they able to repay?

If piping is also being done, we can consider paying your supplier directly to avoid the diversion of funds.

A three-year moratorium is too high.

Ishmael thinks 10 years is a long time. The Bank can give 1-year moratorium. 3 years high.

There will be BoQs, and stages where funds can be paid in chunks, and pay the supplier directly, as due diligence to avoid diversion. Funding can be designed as Projects. Based on the status on the ground and supporting documents.
There are a lot of governance problems, and influence from County leadership. Procurement can be inflated.

Banks can deal directly with suppliers.
Bank asks who suppliers are, and at what rate?
Bank checks on rates from other similar suppliers, and once comfortable, pay the supplier.

B-1
Still have a facility under AoD

Edwin: Good project based on purpose.
A four-year moratorium is too long, and a repayment period is too long, the maximum we can give is 10 years.
Grace period is included in the project period.
Ishmael: the rehabilitation may need to be done in phases.
This project is not likely to increase revenues unless there is also an increase in connections.
Kimura: EBITDA includes the grant, but the revenues do not.
Edwin: We would want to remove any grant components as far as possible.
Looking at the figures, subject to other cost structures, this still looks doable.

Among the smallest WSPs as per Bank's opinion.
Ishmael: We can have a look at whether rehabilitation will improve revenues. Back to cash flows and its operations.
What's the need? is it increasing consumption and ultimately payment?
Bank: We would tentatively consider medium-low, based on the unavailability of information, the repayment period (10-15), sounds a bit strained in terms of cash flows. The equity ratio is not strong. NRW figures are unavailable as well. Rated low.

Can be considered subject to the improvement of the moratorium and 10-15 years.
Phasing to verify viability would be key. Suggested.

Cost of facilities
Other Credit Life insurance (0.0625% of the amount)
Loan processing 1-3%, subject to negotiation
Interest rates 10-15%, reducing/fixed
No other recurrent fees.

Notes: Securitisation

Prudential Guidelines, 2013, sect. 1.4.4 ‚Credit Risk'' - is defined as the current or prospective risk to earnings and capital arising from an obligor's failure to meet the terms of any contract with the bank or if an obligor otherwise fails to perform as agreed.

Minutes

Meeting	National Bank of Kenya	**Meeting Reference Number:**	WB_27042022
Date:	27 April 2022	**Time:**	0900 hrs EAT
Venue:	Head Office, NBK, Harambee Ave	**Minutes prepared by:**	Tollander

Invitees	Title/Designation
1. Fredrick Kioko	Head of Change, Integration, and PM, NBK
2. Pithon Mutiga	WaSH Financing for Water SMEs and WSPs
3. Reuben Ng'ang'a	RM, Institutional banking Sector
4. Jamila Kata	Relationship Manager, WaSH
5. Fujii Masayuki	JICA
6. Kazunari Kimura	JICA
7. Nogami Masaharu	JICA
8. Satoko Shibata	JICA
9. Tollander Wabwire	JICA

Absent with apologies

Invitees	Title/Designation
1.	

Proceedings:

Fredrick

- NBK is about 53(1968) years sits since its formation, as a government institution to design banking and finance programs.
- 2019, September, NBK was acquired 100% by KCB PLC, (KCB PLC is owned 28% by government), a regional bank with a presence in Kenya, Tanzania, Rwanda, South Sudan and lately intending to enter the Democratic Republic of Congo (DRC).
- NBK is keen on a partnership to drive business and sustainability in water market.
- During Covid-19, NBK focused on 6 impact areas namely, Agriculture, health, education, energy, water, and sustainable communities [Social impact areas].
- At the end of 2020, NBK designed a water program – 'Majikonnect' (with support from Aqua for All (AfA), from the Netherlands, bringing in TA to targets). Majikonnect has launched at end of September 2021.
- NBK's key stakeholders included the regulator (WASREB), Kenya water Institute (KeWI), technology companies (Safaricom), and Smart People Africa (for smart Metering) among others.

Reuben

- NBK is keen on public WSPs. As per the 2010 Constitution, the services were devolved, and the Companies are now owned by local Counties. Key challenges include a lack of collateral, need for lower-priced money.
- NBK has been financing based on cash-flows, supporting with efficient user-fee collections to improve efficiency, improving NRW (physical and financial), with solutions such as smart metering to enhance efficiencies, high overheads, and governance improvement.
- NBK is in discussions with African Guarantee Fund (AGF)[1] for possible guarantee schemes to de-risk funding. Currently, financing cost is still expensive (interest @ 13%, but we are looking for partners who can help reduce this to about 9%) to make it competitive.
- Working with WASREB to help approve adjusted tariffs to accommodate additional financing.
- NBK seeks letters of no-objection.
- Take Debentures on moveable assets, where applicable. (20% of book value, to factor depreciation, for comfort. Common practice is guided by the law but is a matter of last resort.)
- Require that all monies be channeled through the Bank for the entire period of the loans, so we have visibility of its financial operations through escrow accounts.
- Phasing of projects for sustainability.
- NBK focuses on Tier 2&3 WSPs in urban and Peri-urban regions.
- NBK does not take tier 1 because it has received multiple supports before.
- NBK has many applications but have currently screened 7 out of all applications for possible funding. Common areas of support include billing efficiency, collections, and expansion of networks among others.

Fredrick

- Through AfA, NBK got TA to WSPs enabling us to lower rates by a point as an incentive.
- NBK developed a curriculum through KeWI to focus on the entire sector and target our staff working with water SMEs and WSPs.
- NBK is co-sponsors of KeWI symposium on how to reduce NRW, with Safaricom and NBK being the anchor sponsors, to enable us to influence policy and good practice in the water sector.
- NBK also runs an exchange program with KeWI
- NBK forecasted to finance KES 5 billion in the next 5 years.
- NBK is financing a pipeline of small retail outlets, water vendors, ATMs, trucks and bowsers, and some in the sanitation worth KES 150 million.
- In response to whether the bank has experience with long-term financing, NBK focus on short-term financing, about 5-years with a higher impact on last-mile connectivity, with easy revenue collection.
- Longest project NBK has gone into is 84 months-long but phased development. WSPs are struggling with cash-flow problems and thus the phasing, to be able to manage. Eldoret piloted 3,000 smart metering

[1] AGF: African Guarantee Fund is a non-bank financial institution whose objective is to promote economic development, increase employment and reduce poverty in Africa by providing financial institutions with guarantee products and capacity development assistance specifically intended to support SMEs in Africa.

connections, and then a full rollout of 10,000. This requires TA as well and the cash flows these WSPs have are very limiting.

Reuben

- NBK requires collateral/guarantees.
- If NBK gets guarantees of about 50%, then the rest on Debentures and other collateralization available, WASREB rating, and collection accounts.
- Affordable guarantee schemes blended with debt financing will make it easier to lend to these public WSPs.

Jamila

- Had some experience financing WSPs on a long-term basis (OBA). These were phased projects as well, covered in part by guarantee and debt (blended).

Fredrick

- Thinks that TA on both ends of the market divide is necessary (approved engineering, designs, and technical project appraisals, before presentation for financing).
- NBK is in advanced talks with AGF, and NBK may finalize in the next 1 month. AGF is still expensive, but NBK are still looking for partners who can help bring this lower.

Reuben

- On responding to the question on the difference in lending to WSPs and other ordinary SMEs, going by the requirements listed on the NBK water program, differences lie in lack of P&L (don't make a profit), lack of securities, poorer/political governance structures, and not well trained to manage companies, need for the regulator to assign you repayment through formal tariff adjustment.
- Subject to other public-good dynamics, e.g., the government changed tariffs through a directive during Covid-19 despite the linked financial obligations between financiers and the companies.
- NBK would like to have visibility of other financing facilities/guarantees.
- NBK has collaborated/discussed with Development Finance Corporation (DFC), WSTF (OBA), and the DFC guarantee scheme to supplement AGF, which is more expensive.

Fredrick

- NBK has gone to WASREB for training to learn about financing the WSPs.
- A single project maybe around $ 2 million dollars based on the kind of applications NBK has received in the past.
- The Program for us gives us a structure to understand the sector and to interact with key stakeholders effectively.
- The Program is funded by National Bank of Kenya funds but is open to new partnerships. AfA provides TA in product development, studying technical requirements, marketing, visiting sites, and curriculum development for water financing to WSPs and SMEs. Nairobi alone has 8,000 water vendors, therefore a key sector.
- AfA provides grants to facilitate/deploy financing programs and TA for preliminary services to a project (regulator, government, public participation at the local levels. AfA will pay for the engineers that will support a project NBK is pursuing.
- There are similarities between this JICA's project role and AfA.
- NBK advertises/presents at different water fora and symposia targeting WSPs and water SMEs, where decision-makers happen.

Reuben

- NBK has financed Bomet, Kakamega, and Malindi for water for smart meters, and ERP systems.
- Thika water, $ 2 million for new 10,000 connections
- Murang'a South Water Company (with complete feasibility, 20% of own resources, engineering done – through WASHFIN, DFC)
- Kisumu, new office building, already approved
- Upper Tana Water Fund, establishing an endowment fund to protect the water catchment that supplies Nairobi).
- Solar for Kikuyu and Kiambu water, awaiting letters of no objection from their respective Counties.

- In general, NBK seeks to unlock a $ 14 million pipeline.
- All WSPs are free to apply to NBK Water Program.
- NBK is seeking collaboration where some of our support overlaps with some of these SMEs.
- NBK is pursuing a partnership with Water Equity, a US-based water Fund that funds water projects, for a loan worth $ 10 million, negotiated at 3.5% p.a. for 5 years.
- Collateral, pricing of loan and need for TA are the biggest challenge in lending to WSPs.
- JICA can also be a Technical Assistance partner

Minutes

Meeting	National Bank of Kenya (NBK)	**Meeting Reference Number:**	NBK_070720221000
Date:	07 July 2022	**Time:**	1000 hrs EAT
Venue:	NBK Head Quarters, Harambee Ave	**Minutes prepared by:**	Tollander

Invitees	Title/Designation
1. Fredrick Kioko	Head of Change, Integration, and PM, NBK
2. Reuben Ng'ang'a	RM, Institutional Banking Sector
3. Jamila Kata	Relationship Manager, WaSH
4. Fuji Masayuki	JICA
5. Kazunari Kimura	JICA
6. Satoko Shibata	JICA
7. Tollander Wabwire	JICA

Absent with apologies

Invitees	Title/Designation
1. NA	N/A

Purpose: To obtain the Bank's insights on the bankability of shared teasers.

Jamila: Status on African Guarantee Fund (AGF) contract finalization

- On 30th June, the Bank signed a term-sheet (with AGF risk), awaiting a formal offer. We estimate to finalize this by end of July.
- Guarantee period 5 yrs.
- Cost is 2.1-2.4% of the loan amount, one-off covering the outstanding (on a reducing balance basis). This cost is normally passed on to the client in full.
- Interest about 13%.
- AGF covers between 50-75% of the loan, based on groups of facilities. It is often higher for say special groups energy-related, climate, and women-led businesses. The water companies will be covered at 50%, while the rate will vary for other water value chain actors depending on the specific type of business.
- Aqua for All, a Partner in the sector has met the one-time fee for the guarantee.
- Maximum cover is 100 million, considered on a case-by-case basis.

Jamila: Status on Water Equity contract

- Water Equity (another Partner), approved a USD 10 million facility, sent term sheet, awaiting formal (offer) letter. The Bank (NBK) is in the final stages of this partnership. This is a debt facility for onward lending, and it will be disbursed in two equal tranches of USD 5 million upon depletion of the first transfer.
- Water equity facility (denominated in USD) was obtained at a 4.5% interest rate and will be lent at 9%, the prevailing market rate for USD loans in Kenya.

Kioko: Interest rate for WSP is still 13%. On responding to the question [from Kazunari] on how the WSP would benefit if the Bank was going to lend at the market rate, said that there would be a reduction by a unit on the one-off appraisal fees (i.e., 2%, instead of 3%), other services (digital revenue collection capabilities offered by the Bank), capacity building, water conferences, social programs. WSPs working with NBK get a Package Value from the water program designed as a first in Kenya.

Bank's opinion on shared teasers.

A-1

Kioko: Grace period: We expect that interest would be paid during the grace period.

Repayment, the electricity cost, can be diverted to cover the loan repayments.

Phasing that can allow some usage for converted revenues to be available for initiating payments.

We would take customers' master collection accounts, as a risk measure. The incentive on the part of the WSP would be to have access to a good digital collection system, which may not be available at their current bank. Multi-channel payment. The guarantee element would work only if within the project implementation period.

For small loans, we still need to take the partnership arrangements that span longer periods (Programmatic view to lending). We would also hold debentures as well, as a form of collateral, in addition to taking up the master collection accounts.

Teaser A-2

[Same WSP, different project]

Grace period: Need more info on smart meters, and why 10 years? Maybe 5-years at most.

The period goes beyond the planned guarantee period of 5 years and may need to have a special request to exceed the period by entering new negotiations with the guarantor.

Suggested phasing, to align, and to ensure that the loan term and the guarantee fully overlap.

Are they metering larger customers? Corporates? Hospitals? Industries? schools/colleges? What is the proposed metering strategy? [large users first], then retail, can be a good approach.

Collections are important because, in management quality, metering, and collections, we get the story early, and patterns of drought can be seen. Collection data helps to reinforce repayments, combined with better collection systems.

Teaser B-1

Kioko:

- Low appetite/I would score this lower than earlier teasers.
- What's the strategy? are they increasing collections? NRW reduction? The project is good if it can show how they will keep up cash flows. The impact on collections is likely to be direct in the case of failure. If not done properly, collections will be hit.
- Management quality is important. NRW vs patterns of the collection will give signs of collection issues/efficiency.
- If the Bank happened to pick this project, it may require that smart meters be added for better collection tracking.
- Considering high O&M for most WSPs, the net revenues are likely to stay depressed for this case. WASREB may not approve the review of the tariff. Chances are that this project may not get the requested KES 100 million for this project [Kioko's opinion].
- It is also likely to get push-back from the public because they are getting tariff hikes without visible improvement in quality of supply/service likely to be the outcome of infrastructure overhaul/improvement alone.

Jamila: On the question about TA scope from JICA, Kazunari clarified that we will offer TA from both tech and financial, including tender assistance.

Kioko: thinks that support through implementation would be important for building the capacity of the sectors to see through projects successfully. Consider implementation support, because of ownership structure and the risk of changing leadership at the counties, an element which can be mitigated by strong PM. For instance, financial release with some input from TA support. Critical for project continuity.

Fuji: On approval from Counties, Kioko clarified that WSPs independently approve borrowing at the Board level and the County only indicates whether they are ok with the request to obtain finance from a particular financial institution. The County does not decide on behalf of the WSP.

According to Kioko, once all requirements are met, the Bank will typically take not more than 30 days to disburse.

Minutes

Family Bank

Meeting	Family Bank	**Meeting Reference Number:**	COB/KE_22062022
Date:	22 June 2022	**Time:**	10:00 hrs EAT
Venue:	Family Bank Head Office	**Minutes prepared by:**	Tollander

Invitees	Title/Designation
1. Fenasio Thariki	Family Bank Senior Manager, SME
2. Shohei Yamamoto	JICA Team (deputy team leader)
3. Kazunari Kimura (Online)	JICA Team (Deputy team leader)
4. Nogami Masaharu	JICA Team
5. Satoko Shibata	JICA Team
6. Wabwire Tollander	JICA Team

Absent with apologies

Invitees	Title/Designation
1. NA	

Bank structure for the water sector

- ✓ 2 members specialized for water sector;
  - ➢ Denis Ndonga (Small WSPs)
  - ➢ Stephen Siwa (WaSH, previously worked at Eldoret WSP)

Bank lending performance in the Water Sector

- ✓ Bank has experience lending to WSPs, both small private and Public.
- ✓ Banks, along with partner institutions, have prioritized lending to public WSPs in an environment where blended funds (WSTF) and risk sharing models (e.g., credit guarantees, African Guarantee Fund (AGF), ring-fenced collection, credit loss pools) are being implemented.
- ✓ The longest loan issued in this sector was a 10-year loan with a WSTF grant partnership. The bank's highest WSP was KES 160 million without a partner.

Loan terms and conditions

- ✓ Interest Rate: 12-15% (including loan processing fee)
- ✓ Guarantee: Guarantee fee (1-2% of the loan) paid first. Result is that the loan facility becomes quite expensive and that makes the offer unattractive for WSP.
- ✓ Security: The regulatory requirement is to cover 100% of the bank's loans. However, there is room for innovation here, as the collateral does not have to be tangible collateral, such as physical assets.
- ✓ Loan term: with a partner, the bank can provide a 10-15 year loan.

Bank's WSP financing initiatives

- ✓ The Family Bank is working on a structure for financing WSPs.
  1. Expert placement for WSPs
  2. OBA (WSTF) and USAID "pay-for-performance" (Palladium)
  3. Facilitate loans to the water sector, drawing on lessons learned from loans to other sectors
  4. A percentage of the loan amount is returned to the bank's branch earnings as an incentive.
- ✓ The bank offers a loan called "Maji-Plus". The bank lend up to KES 1 million on an unsecured basis for a maximum term of 2 years. The reason for this is to keep the term as short as possible, since it is unsecured, and to match the credit guarantee period, which in the case of AGFs is often 2 years.
- ✓ Guarantees: AGF's guarantees focus on short-term loans and do not cover more than two years. Banks are looking for other options to grant longer-term guarantees. (Guarantees are always necessary due to various risks, such as WSP political risk, governance, collateral issues, etc.)

Assistance the Bank needs for WSP financing

- ✓ Key elements that the Bank may partner with include (but are not limited to)
  1. Structuring for unsecured financing
  2. Ring-fencing for collections
  3. Project quality (bankability and effectiveness) prior to submission to the bank

4. NRW problem resolution
5. Governance Improvements

MINUTES OF MEETING OF THE PROJECT FOR STRENGTHENING CAPACITY OF WATER SERVICE PROVIDERS ON FORMULATING BANKABLE PROJECT PLANS HELD IN THE WATER SECRETARY'S OFFICE, MAJI HOUSE ON 12TH JULY, 2022 AT 8.30AM

PRESENT

	NAME	ORGANISATION
1.	ENG. SAMWEL A. O. ALIMA	MINISTRY OF WATER, SANITATION AND IRRIGATION, WATER SECRETARY- CHAIRING
2.	MASAYUKI FUJII	JICA TEAM, TEAM LEADER/WATER SUPPLY PLANNING 1
3.	SHOHEI YAMAMOTO	JICA TEAM, DEPUTY TEAM LEADER/WATER SUPPLY PLANNING 2
4.	KAZUNARI KIMURA	JICA TEAM, DEPUTY TEAM LEADER/FINANCIAL ANALYSYS/BUSINESS PLANNING1
5.	GEORGE KARANJA	JICA TEAM, COORDINATOR

AGENDA

1. Opening Remarks from the Chairperson
2. Introductions
3. Presentation and discussion on the priority projects
4. AOB

1. OPENING REMARKS FROM THE CHAIRPERSON

The meeting was chaired by the Water Secretary, Eng. Samwel A. O. Alima. In his opening remarks, he welcomed the JICA Team and said requested the meeting to proceed since the time was short.

2. INTRODUCTIONS

The JICA Team introduced themselves led by Mr. Fujii.

3. PRESENTATION AND DISCUSSION ON THE PRIORITY PROJECTS

Mr. Fujii of JICA Team (Team Leader) started by recommending that he will start with the conclusion after which the Water Secretary can give his comments. The Water Secretary agreed to this.

Mr. Fujii of JICA Team then started by sharing a handout (attached to these minutes as **Annex 1**) showing a schedule of the 12 WSPs and the proposed projects for funding. The handout also indicated the phasing of this project into Phase II (year 2023) and III (year 2024). Blue and orange bar graphs for five of the WSPs while it was blank for the other WSPs. He explained that the blue bars indicated projects recommended for commercial financing for those WSPs with willingness to take commercial loans, while the orange bars indicated the projects that will be recommended to JICA for feasibility study.

For the 7 WSPs in which the graphs were blank, Mr. Fujii of JICA Team informed that:

- Isiolo WSP had stated that they do not want to borrow any loan.
- Nzoia and Mavoko WSPs had no project since they had not provided any information after being requested to do so.
- Ngagaka WSP was only interested with a grant from the Water Works Authority.
- Eldoret WSP has a very good project but since it is already at the tendering stage, there was no room for cooperation with the JICA Team.
- Embu WSP already has experience in borrowing funds from banks and other sources and is interested in blended funds and not pure commercial loans, hence will be excluded from the project.
- Murang'a WSP's project was not so good and therefore had been excluded from the JICA project.

Mr. Fujii of JICA Team then stated that they were looking for opportunities for pure commercial funding and that 4 WSPs (Ruiru Juja, Nakuru, Kisumu and Nanyuki) had good projects for pure commercial funding. He elaborated the projects as follows:

i) Nakuru WSP: High efficiency pumps and solar panels at Nairobi Road borehole site.
ii) Nanyuki WSP: Replacement of old pipelines in Nanyuki Town.
iii) Kisumu WSP: Replacement of old pipelines and pumps. However, they already have some borrowed funds hence will require approval from their Board of Directors to borrow more.
iv) Ruiru Juja WSP: A very easy project of pipe replacement

He also stated that the JICA Team had recommended three WSPs (Nanyuki, Kisumu and Meru) for feasibility study.

Mr. Fujii of JICA Team then clarified that Nanyuki can negotiate with banks for the commercial loan but Kisumu would need assistance from the JIA Team. He also said that they would wish to select 6 WSPs but although Murang'a WSP wants to borrow in combination with grant funding, it has 3 no so good projects including one very big project estimated at Ksh 2 billion.

Eng. S. A. O. Alima (Water Secretary) recommended that the JICA Team do a feasibility study for Murang'a WSP. He also suggested the team scrutinize all the 87 WSPs using the new rating on creditworthiness. Mr. Fujii of JICA Team said it would be too much work but also regretted that they had not take any WSP in Coast Region due to their poor financial status.

Eng. S. A. O. Alima (Water Secretary) recommended to the team to try Mombasa WSP. He also suggested the Nairobi WSP to which Mr. Yamamoto said that it is too big has poor financials. Eng. S. A. O. Alima then confirmed to the team to take Murang'a WSP and also strongly requested the team to take Mombasa WSP.

Eng. S. A. O. Alima (Water Secretary) enquired whether the project could consider resource development projects taking into account that Nakuru WSP has no other source in case the boreholes are exhausted. Mr. Yamamoto of JICA Team said that Nakuru's borehole source is good.

Eng. S. A. O. Alima (Water Secretary) further enquired whether any of the WSPs had a non-revenue water project. Mr. Yamamoto replied that the best way to reduce NRW is first to replace all pipes, secondly to install accurate meters and thirdly to develop the WSP's capacity. He also said the Eldoret WSP is implementing some non-revenue water project.

Eng. S. A. O. Alima (Water Secretary) then confirmed that the JICA Team's recommendation to take Nanyuki and Kisumu WSPs for commercial funding and feasibility study; Nakuru and Ruiru Juja WSPs for commercial funding and, Meru WSP for feasibility study. He further confirmed that the JICA Team will add Murang'a and Mombasa WSPs for feasibility study.

Mr. Kimura of JICA Team then shared a handout titled "Bank Interview on Teasers" (attached to these minutes as **Annex 2**). It contained a summary of interviews with commercial banks whereby they were provided with financial status of WSPs (without indicating the WSPs identities) and their projects size, loan requirements (amounts), proposed grace/repayment periods and other financial data. He explained that to tease is to provide with information without revealing the source. He further explained that they visited three banks and provided three projects from the WSPs on the teaser as follows:

Bank Symbol	**X**	**Y**	**Z**
Bank name	Equity Bank	Cooperative Bank	National Bank
Project Symbol	**A-1**	**A-2**	**B-1**
WSP Name	Nakuru	Nakuru	Nanyuki

The project costs were ranged from Kshs 100 million to 470 million with implementation periods of 3 to 4 years.
Mr. Kimura of JICA Team said that the results of the teaser was that Equity Bank was very positive to the teaser while Cooperative Bank was the least positive.

Fujii of JICA Team said that Nakuru WSP had indicated that they do not want to shift to National Bank because their main bank is different. He also said that for Kisumu WSP, the feasibility study is a long-term study since it will take 1.5 years. He indicated that the Team will discuss with JICA and inform the outcome of the discussions to the Water Secretary.

Mr. Yamamoto expressed his worry that Nzoia and Mavoko WSP may complain of being left out of the project. Eng. S. A. O. Alima (Water Secretary) said that they cannot complain because they did not provide the information when they were requested. He said that he will tell them not to come for the meeting in September since they do not have any project.

AOB
There was no any other business and the meeting ended at 8.55 am.

SUBMISSIONS

For Ministry of Water, Sanitation and Irrigation	For JICA TEAM
_____ Eng. Samwel A. O. Alima	_____ Mr. Masayuki FUJII

Water Secretary	Team Leader
Ministry of Water, Sanitation and Irrigation	JICA TEAM
The Republic of Kenya	

Annex 1 : Schedule of the 12 WSPs and the proposed projects for funding.

Annex 2 : Bank Interview on Teasers

MINUTES OF MEETING OF THE PROJECT FOR STRENGTHENING CAPACITY OF WATER SERVICE PROVIDERS ON FORMULATING BANKABLE PROJECT PLANS HELD IN NAKURU ON 30TH JUNE, 2022 AT 11.00AM

PRESENT

	NAME	ORGANISATION, POSITION
1.	MARGARET KINYANJUI	NAWASSCO - CHAIRING, TECHNICAL MANAGER
2.	JAMES M. GATHAURU	NAWASSCO, COMMERCIAL MANAGER
3.	ISAAAC M. MAKORI	NAWASSCO, FINANCE MANAGER,
4.	LEONARD MUTAI	NAWASSCO, Non-Revenue Water Officer
5.	CATHERINE MUTWIWA	MINISTRY OF WATER, SANITATION AND IRRIGATION, JICA DESK ASSISTANT
6.	MASAYUKI FUJII	JICA TEAM, TEAM LEADER/WATER SUPPLY PLANNING 1
7.	SHOHEI YAMAMOTO	JICA TEAM, DEPUTY TEAM LEADER/WATER SUPPLY PLANNING 2
8.	KAZUNARI KIMURA	JICA TEAM, DEPUTY TEAM LEADER/FINANCIAL ANALYSYS/BUSINESS PLANNING1
9.	SATAKO SHIBATA	JICA TEAM, FINANCIAL ANALYSYS/BUSINESS PLANNING2
10.	TAKASHI NAKAJIMA	JICA TEAM, WATER SUPPLY PROJECT DESIGN 2
11.	TAISUKE WATANABE	JICA TEAM, WATER SUPPLY PROJECT DESIGN 1
12.	GEORGE KARANJA	JICA TEAM, COORDINATOR

AGENDA

1. Opening Remarks from the Chairperson
2. Introductions
3. Presentation and discussion on the priority projects
4. AOB

1. OPENING REMARKS FROM THE CHAIRPERSON

The meeting was chaired by the Technical Manager, Eng. Margaret Kinyanjui. In her opening remarks, she started by welcoming the members present and informed that the Managing Director was absent for another meeting. The Finance Manager also welcomed the members and hoped that the JICA team was now familiar with NAWASCO.

2. INTRODUCTIONS

The Technical Manager lead NAWASSCO team in self-introduction after. She then requested the JICA team to introduce themselves which they did.

3. PRESENTATION AND DISCUSSION ON THE PRIORITY PROJECTS

a) Confirmation of Project Fund Trends

Mr. Fujii,JICA Team Leader, shared a handout showing the 4 priority projects submitted by NAWASCO and proceeded to take the members through it (attached to this minutes).

The JICA Team Leader stated that the JICA Team was looking for opportunity to work with NAWASSCO unless the latter had already found other funding. The Technical Manager reconfirmed that they had not yet found other funds and were eager to work with the team. She said that NAWASSCO had applied for AOD for priority project IV (Network Improvement/extension and NRW reduction and management Plan) and other sewer improvement project (network expansion and construction of sewer treatment plant and had a meeting with KFW on Monday the 27th June. It is a National Government project estimated at Kshs 5.6 billion (mainly loan and some grant) and is to be implemented through the WWDA but to be paid by NAWASSCO.

JICA Team Leader sought to know whether NAWASSCO was having any discussion with Aqua For All. The Technical Manager stated that there had not been any discussions. She also sought clarification on the conditions of the funding; whether it will be a loan or a grant or a mix of the two.

The Finance Manager stated that if it is a loan, then payment will be through tariff increment or take-over by the National Government in liaison with the County Government since the WSP's mandate is provision of water services. He confirmed that NAWASSCO has no loan in the balance sheet but pays fees to the WWDA to offset any loan taken. Currently, NAWASSCO pays Kshs 39 million per year through tariff to offset a Kshs 1.4 billion (including interest) loan. Therefore, if another loan is taken and the volume of water does not increase, the tariff will need to be increased to cover the loan.

b) Priority Project II: Installation of Solar panels for pumping, high efficient pumps (for development and improvement of Boreholes)

The Technical Manager(TM) stated that NAWASSCO is in discussions with the WWDA but not yet finalized. At first the option was to identify an investor who would implement the project with his own funds and then recover his investment over time through the revenue. However, the option is not possible since it would be single sourcing method of procurement and not recommended in the procurement law.

Mr. Yamamoto of JICA Team informed that if single sourcing method of procurement is adopted then this project cannot proceed.

The TM stated that the procurement process is still under consideration but single sourcing is not allowed. She said that the WSP prefers availability of a financier for the project through loan or grant or blended.

c) Priority Project I: Installation of Smart meters in all zones (Northern, Eastern, Western, Central and Southern)

The Commercial Manager (CM) intends to make all the 40,000meters smart. They have determined the cost to be Kshs 12,000 per connection. He said that most of the existing meters are not smart-ready and they have been buying those that are smart-ready in the last 4 years. They have 15,000 smart-ready meters of which 4,000 are already installed at a cost of Kshs 7 million. They plan to start with the central zone which has 9,500 connections.

JICA Team Leader enquired whether the company is willing to borrow money from commercial banks where the interest is around 13 to 14%

The CM said that the WSP has experts who have been looking at the efficiency to determine whether the loan can be paid by the improved efficiency. He said that they had piloted with 300 meters from January 2021 and found that the efficiency can cover for the cost.

d) Priority Project III: Production optimization project at Kabatini

The TM said that they are looking for technical assistance to come up with documentation i.e. feasibility study, basic design, tender documents, etc. (since this a completely new project). She said that the site has more water potential but land is not available and may have to be procured. She said that Kshs 720 million is just a rough estimated cost. She indicated that they do not have the geotechnical survey data and water balance calculation result.

Mr. Yamamoto of JICA Team enquired the number of boreholes and whether their distribution networks can be separated into blocks. The TM said that their distribution networks cannot be separated because all the water must first go to Mireroni for treatment through a transmitted transmission main.

e) Potential for Commercial Borrowing

Mr. Kimura of JICA Team enquired which project between priority project I and II has more potential for commercial borrowing.

The CM stated that priority project II has more potential for commercial borrowing. The NAWASSCO Team therefore confirmed that priority project II is now first priority and priority project I is now second priority. However, they said that the two projects should be presented for consideration.

Mr. Kimura of JICA Team explained that the goal for this meeting is to prepare a teaser for commercial banks. JICA team will show a teaser without mentioning the name of the WSP and requesting them for their opinion whether bankable or not.

The TM said that Priority Project II (Installation of Solar panels and high efficiency pumps) is the priority. However, for those sites where land is not available, the installation of more efficient pumps is the priority since it is already piloted and found to be ok.

Ms. Shibata of JICA Team enquired whether NAWASSCO has collateral for taking a loan. The CM said that the assets are owned by the County Government and therefore the WSP has no collateral.

For Installation of Solar panels and high efficiency pumps (estimated cost Kshs 270 million), the Finance Manager said that there is need for a grace period of 3 years (the implementation period) while the loan can be paid within 4 years making the total loan period 7 years. They expect to cover the loan using the 35% of Kshs 20 million per month expected savings from the project.

Mr. Kimura of JICA Team requested for the audit report for the year 2020/2021 but was informed that it was not yet out. He therefore enquired whether the JICA team can provide the financials for year

2020/2021 to the commercial banks to which the FM accepted. Mr. Kimura also enquired why NAWASSCO did not apply for AOD from WSTF for option 1 or 2. The TM said that they applied for Kshs 150 million AOD funds for a different water project and a sanitation project with the water component being Kshs 95 million. The WSP's contribution is between 10% and 40%.

It was also confirmed that NAWASSCO had already shared the documents for energy reduction project with the JICA team.

Regarding the project for Installation of Solar panels for pumping and high efficient pumps, the TM said that there is need to procure land while the land is available for the project on smart meters.

Mr. Fujii of JICA team enquired again whether NAWASSCO feels that the project is feasible and if so, whether they have the willingness to take a loan if the JICA team contacts banks. The TM answered yes.

Mr. Fujii of JICA Team then enquired the approval process if banks agree. The NAWASSCO team replied as follows:

1. The management confirms that the project is viable and can pay for itself.
2. The management then prepare and present a paper to the board.
3. If the board approves, the management obtains no objection from the County Government to borrow commercial loan.
4. The management then process tenders and implements the project.

Mr. Kimura of JICA team informed that the JICA team can assist with the modelling of the project.

Mr. Yamamoto of JICA team enquired what the percentage of O&M cost is the electricity bill. This was given as 25% by the FM.

The TM informed the meeting that they are now revising the project cost from 270 million to 302 million. She also clarified that the solarization will be for 24 boreholes and not 28 as erroneously understood by the JICA team from the borehole schedule shared earlier, since there is no land at the site of the other 4 boreholes.

However, Mr. Fujii ofJICA team stated that preliminary assessment shows that solar projects benefit is very small and hence not viable.

The TM also informed that the cost estimate includes the prefunding costs such as for feasibility and design. To this, Mr. Fujii informed that this JICA consultancy is free of charge.

The JICA team then requested to visit one of the sites. The TM proposed the team visit the Nairobi Road site.

In his closing remarks, the CM thanked the JICA team for holding this meeting and being puncyual and welcomed them again in future.

JICA Team Leadergave his closing remarks requested whether it was alright for the JICA team to prepare the financial and technical briefs and present to banks without indicating the name of the WSP as a teaser. The TM said that this was okay. Mr. Fujii then informed that the team will request for any information from NAWASSCO if needed.

There being no other business, the meeting ended at 12.00pm.

4. AOB

Site visit to Nairobi Road Boreholes

During the site visit, the following was noted:

a) The site has two boreholes:
   - 6" diameter pipe, yield 24m3/hr; funded by National Government through Covid relieve
   - 8" diameter pipe, yield 70m3/hr; funded as CSR by the road contractor
   - The two boreholes are new hence do not need new pumps.

b) The site has a 4,500 m3 storage tank, a dozing house and an office.

c) There is space for solar panels in front and behind the tank. The tank roof can also accommodate more panels.

d) Any excess power from the panels can be transmitted to some other 4 boreholes (2 old and 2 new).

Mr. Yamamoto said that for the project that will be selected, the JICA team will do the study, tender documents, etc together with NAWASSCO staff as capacity building on preparation of bankable project plans.

For Nakuru Water and Sanitation Services Company	For JICA TEAM
_____ Ms. Margaret Kinyanjui Technical Manager Nakuru Water and Sanitation Services Company The Republic of Kenya	_____ Mr. Masayuki FUJII Team Leader JICA TEAM

Annex 1 : priority projects

MINUTES OF MEETING OF THE PROJECT FOR STRENGTHENING CAPACITY OF WATER SERVICE PROVIDERS ON FORMULATING BANKABLE PROJECT PLANS HELD IN NANYUKI ON 1ST JULY, 2022 AT 8.45AM

PRESENT

	NAME	ORGANISATION, POSITION
1.	CAROLINE KIHONGE	NAWASCO – CHAIRING, HUMAN RESOURCES & ADMINISTRATION MANAGER,
2.	WACHIRA GAKURU	NAWASCO, COMMERCIAL MANAGER
3.	PAUL MWANGI	NAWASCO, FINANCE MANAGER
4.	CATHERINE MUTWIWA	MINISTRY OF WATER, SANITATION AND IRRIGATION, JICA DESK ASSISTANT
5.	MASAYUKI FUJII	JICA TEAM, TEAM LEADER/WATER SUPPLY PLANNING 1
6.	SHOHEI YAMAMOTO	JICA TEAM, DEPUTY TEAM LEADER/WATER SUPPLY PLANNING 2
7.	KAZUNARI KIMURA	JICA TEAM, DEPUTY TEAM LEADER/FINANCIAL ANALYSYS/BUSINESS PLANNING1
8.	SATAKO SHIBATA	JICA TEAM, FINANCIAL ANALYSYS/BUSINESS PLANNING2
9.	TAKASHI NAKAJIMA	JICA TEAM, WATER SUPPLY PROJECT DESIGN 2
10.	TAISUKE WATANABE	JICA TEAM, WATER SUPPLY PROJECT DESIGN 1
11.	GEORGE KARANJA	JICA TEAM, COORDINATOR

AGENDA

1. Opening Remarks from the Chairperson
2. Introductions
3. Presentation and discussion on the priority projects
4. AOB

1. OPENING REMARKS FROM THE CHAIRPERSON

The meeting was chaired by the Human Resources & Administration Manager, Ms. Caroline Kihonge. She also requested that the meeting proceed starting with the financials to which was unanimously agreed by all present.

2. INTRODUCTIONS

Ms. Caroline led the NAWASCO team in self-introduction. She then requested the JICA team to introduce themselves which they did.

3. PRESENTATION AND DISCUSSION ON THE PRIORITY PROJECTS

Mr. Fujii of JICA Team then shared a handout showing the 3 priority projects submitted by NAWASCO (attached to these minutes as Annex 1) and said that priority project I and II are within the scope of grant aid request to JICA.

Mr. Kimura of JICA team stated that the interest rate on loans is very high such that for a loan of 1 billion, the interest would be in the range of 150 million per year. He therefore enquired from NAWASCO the amount of loan they had in mind.

The Finance Manager suggested that they should start by first determining the amount needed to complete the project followed by discussions on the loan amount. He also said that there is need to carry out a cost-benefit analysis to make a decision.

Mr. Fujii of JICA Team enquired whether NAWASCO was willing to borrow Kshs 1.2 billion from commercial banks. The FM said they are hoping for blended (loan and grant) financing. Mr. Fujii said that there is need to first consider pure borrowing of Kshs 1.2 billion, and then do design together with NAWASCO staff, followed by submitting to Maji House to be used to apply for a loan and grant.
Ms. Catherine, Ministry said that Kisumu and Embu WSPs had Cooperative Bank loan accounts (escrow accounts) into which they were making daily cash deposits to pay their loans. They had also obtained no objection from their County Governments to take the loans.

Mr. Fujii of JICA Team enquired which project was submitted for grant aid to JICA in 2021. Ms. Caroline stated that it is another project and none of the three in the priority list. Ms. Shibai of JICA Team said that the requests were received very recently in May 2022 and hence analysis is only starting.

Mr. Kimura of JICA Team enquired whether how far NAWASCO had gone with Kenya Pooled Water Fund (KPWF). Ms. Caroline said that KPWF had only prepared a financial model based on WASREB's creditworthiness index for WSPs but did not share the model with NAWASCO. She further said that NAWASCO has since been working to improve their creditworthiness.

The FM, NAWASCO also stated that NAWASCO has never borrowed for projects from commercial banks but for asset financing such as vehicles. He added that NAWASCO is hoping to borrow project loans spanning 15-20 years. Mr. Kimura, JICA team said that this is very difficult and that banks normally want to give loans for around 5 years.

Mr. Kimura of JICA Team enquired the to know NAWASCO's main bank. The FM said it is Kenya Commercial Bank; but also have accounts in Family Bank and National Bank which are currently catering for WASHFIN project that is geared towards water.

The CM enquired how the JICA team will come in if NAWASCO decides to go the commercial bank route. Mr. Kimura, JICA team said the team will assist with the financial analysis. However, the team is looking at Kshs 100 or 150 million maximum to discuss with commercial banks.

Ms. Shibata of JICA team noted that the current tariff expires next year and hence review should start now if any loan is to be captured in the tariff. The CM said that the current tariff became effective in September 2019 and expires in September 2023 but there is indexation in the current tariff to cater for

inflation. A new tariff application will be submitted to WASREB thereafter. He also said that it is not possible to increase the tariff by more than 10% and hence there is need for simulation with various loan amounts.

Mr. Fujii of JICA Team said that the Kenya Government is keen to achieve SDG6 on water but there are no funds. The government is trying negotiate for a loan facility with WB through WSTF where WSPs can access at low interest rates (say 6%) but this is not finalized. Therefore, the only option currently is the commercial loan route. He said that the team will assist in preparation of bankable project proposals and tariff modelling.

Mr. Nakajima of JICA Team shared a handout (attached to these minutes as Annex 2) and made a power point presentation titled "Project component based on the Project Size" with 3 cases:

Case-1: 100 million Kshs – Rehabilitation of WTP, Trunk main (4.6km), Secondary pipeline (6.0Km), Tertiary pipeline (6.9Km), Water kiosks (5Nos), Installation of PRV, GV; SMART cold-water meters (domestic- 53 nos).

Case-2: 250 million Kshs – Rehabilitation of WTP, Trunk main (4.6km), Secondary pipeline (12.8Km), Tertiary pipeline (14.9Km), **Water kiosks (5Nos),** Installation of PRV, GV; SMART cold-water meters (domestic- 53 nos, Electro-Magnetic: 65 nos), Improvement of water meters (15,274 nos), **Replacement of AC/GI pipeline to HDPE (11.3Km).**

Case-3: 350 million Kshs – Rehabilitation of WTP, Trunk main (4.6km), Secondary pipeline (12.8Km), Tertiary pipeline (14.9Km), **Water kiosks (10Nos)**, Installation of PRV, GV; SMART cold-water meters (domestic- 53 nos, Electro-Magnetic: 65 nos), Improvement of water meters (15,274 nos), **Replacement of AC/GI pipeline to HDPE (20.8Km).**

Key to the cases:

- The underlined are the differences between Case 1 and Case 2.
- The **bold** are the differences between Case 2 and Case 3.
- The presentation also indicated the areas to be affected by each case on the map.
- Case 1 was marked as urgent in the design report and was to be implemented by 2019.
- The analysis of each case was also shared as a handout (attached to these minutes as Annex 3)

Mr. Nakajima of JICA Team then requested NAWASCO to discuss and consider depending on the amount of loan they can take from the bank.

Ms. Caroline said that she was happy with all the three cases and that they had given NAWASCO a clearer picture to consider.

Mr. Kimura of JICA Team presented a one page brief on the three cases and enquired whether it was okay for the JICA team to visit some banks the following week and show the brief as a teaser without indicating the name of the WSP. NAWASCO said it was okay.
Mr. Kimura of JICA Team enquired on the preferred grace period and repayment period. The managers stated that they would hope for a grace period of 4 years and a repayment period of 10-15 years.

Ms. Shibata of JICA Team said that NAWASCO had Kshs 30 million land and enquired whether it can present as collateral for the loan. The FM said that use of the land would require approval from the County Government and that the Title Deed is not ready and processing it takes a long time. They recommended that the land should not be considered for this project.

Mr. Kimura of JICA Team noted that KCB is NAWASCO's main bank and enquired whether it was possible to borrow from other banks. The FM said it is possible.
Ms. Shibata of JICA Team enquired whether NAWASCO will manage to obtain no objection from the county government and WASREB. The FM said they will manage. He also said that the National Government must approve the loan even if the county government will give guarantee. However, the county government must confirm that the WSP can pay the loan before it approves.

Ms. Caroline expressed NAWASCO's hope of benefiting from the proposed infrastructure bond by the county Government stating that repayable finance is now an option since the national and county governments have no money.
Mr. Kimura enquired whether KPWF had any specific project with Ms. Caroline responding in the negative. He also enquired whether NAWASCO was working with Aqua-for-All which had taken over KPWF's mandate; and again received a negative response from Ms. Caroline.
Ms. Caroline informed that Priority project III had become a critical priority and needs detailed design. She said that NAWASCO had carried out the detailed design of Priority project I at a cost of Kshs million from own funds. She also said that topographical survey was on Priority project III (Honi River) project was ongoing using own funds.
Mr. Kimura of JICA Team enquired whether NAWASCO has any AOD project. Ms. Caroline said no but a proposal (mainly on sanitation) of Kshs 74 million was submitted to WSTF. The maximum amount disbursable is Kshs 60 million to be implemented in 1 year.

In his closing remarks, Mr. Fujii of JICA Team said that the team will hold meetings with some banks at the end of the following week. He also indicated that the team will visit NAWASCO after the coming elections. He further indicated that Priority project III (Honi River) is one of the long-term candidates for JICA support.

Ms. Caroline's closing remarks was that they were happy with the meeting and expressed hope of seeing positive progress.

4. <u>AOB</u>

There was no any other business and the meeting ended at 12.30pm

For Nakuru Water and Sanitation Services Company	For JICA TEAM
_____ Ms. Margaret Kinyanjui	_____ Mr. Masayuki FUJII

Technical Manager	Team Leader
Nakuru Water and Sanitation Services Company	JICA TEAM
The Republic of Kenya	

Annex 1 : priority projects

Annex 2: Project component based on the Project Size - ppt presentation

Annex 3: Project component based on the Project Size - Detailed Analysis

MINUTES OF MEETING OF THE PROJECT FOR STRENGTHENING CAPACITY OF WATER SERVICE PROVIDERS ON FORMULATING BANKABLE PROJECT PLANS HELD IN KISUMU ON 4TH JULY, 2022 AT 12.00PM

PRESENT

	NAME	ORGANISATION
1.	ENG. MOSES JURA	KIWASCO, CHIEF ENGINEER TECHNICAL SERVICES - CHAIRING
2.	GEOFFREY OPIYO	KIWASCO, PLANNING & DESIGN CHIEF ENGINEER
3.	LIECH M. JOB	KIWASCO, NRW ENGINEER
4.	BRAMWEL OUMA	KIWASCO, GIS ANALYST
5.	CATHERINE MUTWIWA	MINISTRY OF WATER, SANITATION AND IRRIGATION, PC (ASSISTANT) JICA DESK
6.	MASAYUKI FUJII	JICA TEAM, TEAM LEADER/WATER SUPPLY PLANNING 1
7.	SHOHEI YAMAMOTO	JICA TEAM, DEPUTY TEAM LEADER/WATER SUPPLY PLANNING 2
8.	KAZUNARI KIMURA	JICA TEAM, DEPUTY TEAM LEADER/FINANCIAL ANALYSYS/BUSINESS PLANNING1
9.	TAKASHI NAKAJIMA	JICA TEAM, WATER SUPPLY PROJECT DESIGN 2
10.	GEORGE KARANJA	JICA TEAM, COORDINATOR

AGENDA

1. Opening Remarks from the Chairperson
2. Introductions
3. Presentation and discussion on the priority projects
4. AOB

1. OPENING REMARKS FROM THE CHAIRPERSON

The meeting was chaired by the Chief Engineer Technical Services (CETS), Eng. Moses Jura. In his opening remarks, he welcomed the JICA Team and said that they were happy that JICA had considered to work with KIWASCO and hoped there will benefit from the partnership.

2. INTRODUCTIONS

Eng. Jura led the KIWASCO team in self-introduction. He then requested the JICA team to introduce themselves which they did.

3. PRESENTATION AND DISCUSSION ON THE PRIORITY PROJECTS

Mr. Fujii of JICA Team (Team Leader) said that during the previous visit, they had said that they were looking for opportunities. Subsequently, KIWASCO provided three projects for consideration whether on bankability. He thus informed that the purpose of the day's was to visit and understand the projects better and to confirm the priority project. He then shared a handout showing the 3 priority projects submitted

by NAWASCO (attached to these minutes as **Annex 1**) and said that Priority I project is new and the JICA Team would like to visit it. He also said that Priority II project is also new. The CETS said that they had applied for AOD for Priority II project but its funding is not yet confirmed. He further said that Priority III project was included in the application. He said that they had applied for two projects but the second one called Nyamasaria was approved for funding.

Mr. Fujii of JICA Team said that there are two commercial financing options in Kenya: commercial loan from banks and the financing facility being developed by the National Government through the WSTF (not yet available). Therefore, if KIWASCO needs financing now, it needs to consider commercial loan.

The CETS said that they are aware of the way funding has changed with WSTF doing small grants, the AOD and the commercial loans. He added that KIWASCO has a facility that is helping in construction of the new offices, and the tariff was recently reviewed and includes a Kshs 1.4 billion loan used to augment the water treatment plants.

Mr. Fujii of JICA Team enquired whether KIWASCO is currently viable in terms of accessing loans, to which the CETS replied in the negative for now. He said that the details on this issue can be explained by the Managing Director but they are also in the share document called "Kisumu Financial Model". He said that this puts Kisumu in a very tricky position because there is need to expand the water supply to achieve Vision 2030. He wondered how this expansion will be achieved.

Mr. Fujii of JICA Team said that they will discuss the issue with JICA later and added that KIWASCO has no viability to take a loan for now.

Mr. Yamamoto of JICA Team said that in the previous meeting, KIWASCO had said they wanted to implement Priority II project (cost Kshs 400 million) through pure commercial financing. The CETS said he was not in the meeting. However, Mr. Opiyo said that he wanted to know the costing to determine which project is viable for commercial financing based on sustainability.

Mr, Yamamoto said Priority I project is difficult since it requires a lot of money. He said that for Priority II project, some components can be used for commercial financing meaning that there is still some opportunity for commercial financing.

The CETS said that he was requesting for a study for Priority I project. Mr. Opiyo said that Priority II comprises three components (Expansion of pipeline, Electromechanical and Dunga WTP rehabilitation) which are already in the strategic plan hence they can be implemented in parts. Mr. Yamamoto said that there is therefore need to visit the site for the three components. He also said that there is also need to visit the site for Priority I project.

Mr. Opiyo said that there is need to implement Priority II project based on financials but there is also need to determine how the cost will be covered. Mr. Kimura of JICA Team said that bankability should be covered by the whole WSP's financials.

The CETS said that the loan for construction of the new office building is Kshs 200 million. The other loan is the Kshs 1.4 billion taken in 2016 by the National Government on behalf of KIWASCO for implementation

of projects through the WWDA. KIWASCO committed to pay the loan since it was the beneficiary. Ms. Catherine of Ministry said that this type of loan is called legacy loan. She said that the National Government offsets some of the loan.

The CETS said that the Kshs 1.4 billion loan is a challenge since it should be paid through the tariff but KIWASCO tariff is slightly high already. He said that there have been some discussions on restructuring the loan. He said that the loan was taken under the Water Act 2002 where the National Government could take loans and the Water Services Board (now WWDA) would implement, both acting on behalf of the WSP. He however said that this arrangement is not working well for WSP because the are unable to pay the loans.

Mr. Kimura of JICA Team wondered whether KIWASCO signed the loan contract and if not, has no obligation of repaying it. The CETS replied that KIWASCO did not sign the loan contract but that the challenge is that KIWASCO needed the money and that was the only way to access it.

Mr. Kimura of JICA Team enquired whether KIWASCO cannot take another loan when it is still servicing the existing Kshs 1.4 billion. Ms. Catherine of the Ministry said it cannot take another loan.

Mr. Kimura of JICA Team enquired whether KIWASCO is currently paying only a small portion of the Kshs 1.4 billion loan. Mr. Opiyo said yes and they are now looking for ways to accelerate the payment. He added that the only loan allowed for now is the last mile connectivity since they currently have three loans. The CETS said that the position of the finance department is that it is currently difficult to take another loan.

Mr. Kimura of JICA Team enquired whether KIWASCO can take a loan if it can generate viable benefits. The CETS said yes, if if it can elevate the financial position.

The CETS said that the issue of commercial and blended finance was discussed in a WASPA meeting the previous week and it was realized that only Embu and Nyeri WSPs had managed to access commercial financing.

Mr. Kimura of JCA Team enquired whether KIWASCO is comfortable to take a loan at 14% interest rate if the project is financially viable. Mr. Opiyo said the rate is quite high and needs further discussions. The CETS said that there is need to hear from the Commercial Manager and indicated his preference for blended financing.

Mr. Fujii of JICA Team to be shown the outlines of Priority I and III projects. The following projects were presented:

a) The CETS showed a presentation of a desk study that was carried out in 2021 on the water demand in Kisumu as follows:
   i) Kajulu WTP capacity is 80,000m3/day and was expected to serve upto year 2030. However, this capacity has never been achieved. Furthermore, River Kajulu dries up during the dry season and often becomes too turbid during the rainy season sometimes forcing temporary closure of the treatment plant. Luckily, the lake is available to optimize the treatment plant. However, this cannot be done during the dry season due to the invasive water hyacinth that clog the pumping

equipment. Pollution of the lake water at the intake is also continuing to reduce the treatability of the water over time. This pointed to the need for a new project to supply Kisumu with adequate water.

ii) The above situation led to a desk study carried out which resulting in a report titled "The Study on Demand and Alternative Water Treatment Facilities". The proposal involves developing two WTPs to draw water from Lake Victoria (well away from the city to reduce pollution) and install smart (high-efficiency) pumps and solar power/power grid to reduce pumping costs. The estimated project cost is Kshs 3.5 billion, would cover water demand upto year 2039 and has the following features:

- One treatment plant at Rainbow on the western side of the city. Install transmission pipes to and construct tanks at Kodiaga and Coptic areas
- Another treatment plant at Buoye on the eastern side of the city. Install transmission pipes to and construct an elevated tank at Kibos (KPA compound).

The report was presented to the Board of Directors (BOD) which directed that a detailed study be undertaken to check whether the idea is viable.

The CETS stated that the project is the solution to the water problems in Kisumu and appealed for JICA's help to carry out the detailed feasibility and to the full development.

b) Mr. Opiyo explained Priority II project (Kibuye-Migosi-Chiga dedicated distribution booster line and reservoir upgrade and automation) which has four parts is a rehabilitation project to alleviate the current water shortages caused by drought.

Mr. Fujii of JICA Team enquired whether the rehabilitation would be necessary if Priority I project was implemented. Mr. Opiyo agreed with Mr. Yamamoto of JICA Team that the rehabilitation would not be necessary since it is a short-term measure. Mr. Fujii said that the Priority I project very nice but it is too expensive (Kshs 3.5 billion). However, the pipeline is Kshs 264 million. Mr. Yamamoto said if a new pipeline has to e installed, then there is no need for two WTPs since O&M would be more expensive. Mr.Opiyo said that the water at Dunga intake is already green hence it's under great threat. Mr. Yamamoto said that there is need to confirm the condition of the pumps and also visit the proposed sites of the new WTPs. The CETS said visit the sites would need 3 to 4 hours.
Mr. Yamamoto reminded the CETS that he was to prepare the concept note for Priority 2 project. The CETS and Mr. Opiyo promised to prepare and provide the concept note to the team.
The meeting adjourned for the site visit.

4. <u>SITE VISIT</u>

a) <u>Visit to proposed Rainbow WTP site</u>

The site was found to be suitable for a WTP. However, there is need to acquire adequate land.

b) <u>Visit to proposed Kodiaga elevated tank site</u>

Mr. Yamamoto said the site seems too high and the correct location will be determined by calculations.

c) Visit to Coptic Tank (existing) site
No comments were made on this site.

d) **Visit to proposed Kibos Elevated tank site**
The actual proposed site could not be reached because it is within the compound of the Kenya Ports Authority (KPA). The proposal is to request for space from KPA to build the tank and sign an MOU.

e) Visit to Proposed Buoye WTP site
The visit ended 2.5Km from the proposed site due to lack of access road. The area is very low laying and flat. There were signs of flooding with one local house having a flood water mark upto the window seal. However, a developer lady who has constructed a one-storey mansionette agreed to talked to the team and said that the flood water came once from upstream and entered her house upto about 4 inches. She said that the flooding stayed for about one month.

f) Visit to Kibuye booster pumping station
The tour guide said that during the dry season, the capacity of the pumps and transmission pipe are not adequate to cater for some areas hence there is need to replace them and make the pumps smart.

g) Visit to Riat Site
The site has a ground tank, elevated steel tank and a pumping station. No observation was noted.

The site visit ended at 6.30pm.

5. WRAP UP MEETING HELD ON 5TH JULY 2022

The meeting started at 8.30am and was attended by the same members as on the previous day.
Mr. Fujii thanks KIWASCO staff for the meeting and site visit the previous day and said that the JICA Team had obtained very good information and have understood KIWASCO's plans. He said that it is obvious Kisumu has to take water from the lake.
He noted that Priority I project is a big project while for Priority III project, there is need to minimize pumping in the rainy season and try to utilize Kajulu river water.
Mr. Opiyo said that there is usually a period of 4 to 5 months of uncertainty due to drought. He said that they try to shut down Kajulu in the rainy season due to high turbidity. Further, there is the problem of quality at Dunga intake due to the hyacinth, hence they try to balance the two sources.
The ETS said that they understand the concern on Priority I project and they will try to re-check the cost-benefit analysis
Mr. Yamamoto requested for a copy of the submitted AOD proposal. The CETS promised to share all the proposals submitted for AOD with the JICA Team.

The CETS said they know that Priority I project is a capital-intensive project but requested JICA to help on it. He also said they have understood the need to have only one and not two WTPs. He said that there is need for a feasibility study and that this assistance is a special request from KIWASCO to JICA.
Mr. Yamamoto said that the JICA Team has understood this request.

Mr. Yamamoto said that they had requested for a concept note for the Dunga-Kibuye transmission project during the previous visit but had not received yet any. He enquired to be given a brief.
Mr. Opiyo said that Dunga -Kibuye has 3 transmission pipes as follows:

a) An old asbestos pipe 9" diameter: It has many bursts due to age and needs replacement. It was excluded from submission to JICA Team because it had been submitted AOD funding request.
b) 14-inch diameter uPVC pipe: There has been many improvements e.g. change in pumps and hence it is susceptible to many bursts if it is not realigned. It needs to be replaced with HDPE pipes. It was also submitted for AOD funding.
c) 24-inch diameter steel pipe: It is just like the 14-inch pipe.

The CETS and Mr. Opiyo said that there is need to add Dunga-Kibuye line to Priority III project. It was not shared with the JICA Team because it is among those projects submitted to Covid Local Support Grant (CLSG) programme for funding. CLSG is a fully grant programme initiated in 2020 during Covid outbreak and is still scrutinizing the applications.

Mr. Yamamoto requested KIWASCO to share, in a prioritized manner, all the proposals submitted for AOD funding excluding those already funded. He said that the priority for study is still No.1 but the priority for implementation should be provided immediately on the day.

Mr. Kimura of JICA Team presented a one-page brief indicating that the JICA Team will visit some banks the following day and show them some project teasers without indicating the name of the WSP to see their reaction- whether the projects are bankable or not. He requested for a small project costing 100-200 million. The CETS said that it is okay to share with banks. He added that the proposals submitted for AOD funding are okay for this purpose and promised to share in a prioritized manner to avoid confusion.
Mr. Kimura requested KIWASCO to share the projects requiring a loan. He also requested KIWASCO to share the WSP's revenue, costs, projects concept notes, financial position and any collateral available.

Mr. Yamamoto said that the JICA Team will hold discussions with JICA within the week and reminded KIWASCO to send the concept note for Priority II project otherwise it will be omitted.
He also wondered whether KIWASCO had any NRW reduction project. Mr. Opiyo said that they have metering and zoning which are med- to long-term. The Dunga asbestos distribution pipe was also listed as a NRW reduction project.
Mr. Yamamoto enquired the target for NRW reduction if the pipe is replaced to which Mr. Liech gave as 8%. Mr. Yamamoto was sterned and said that 8 % was very big and the pipe should be replaced immediately.
Mr. Opiyo then shared a list of the 10 projects (table below) submitted for CLSG and AOD funding and indicated that the first 5 projects had been funded leaving the other 5 projects.

	Summary Works Covid Local Support Grants (CLSG) Support Proposal					
Priority	**No.**	**Description Of Works**	**Cost Estimate**	**Total Length (m)**	**Modal Dia. (mm)**	**Remark (s)**
4	1	Arina Overhaul Works	27,212,637	6,018	63	Under Review for approval by WSTF
4	2	Gudka Estate Overhaul Works	6,433,734	2,000	63	Under Review for approval by WSTF
4	3	Lower Railways Overhaul Works	8,014,548	1,400	63	under Review for approval by WSTF
3	4	Kajulu-Mamboleo Asbestos Overhaul Works	113,357,055	13,250	200	LVWATSAN Proposal
3	5	Kamaler-Guba Upgrade Works	66,925,103	8,400	250	Under Review for approval by WSTF
1	6	Millimani 14-Inch Distribution Main Overhaul	41,442,828	1,800	350	LVWATSAN Proposal
1	7	9" Asbestos Overhaul	22,152,964	1,150	225	LVWATSAN Proposal
2	8	Production Plants Pump	38,508,089	Other		Not Taken
2	9	VFDS	32,499,819			Not Taken
	10	Metering	101,336,001	Other		Not Taken
		Proposal Grand Total	**457,882,778**	**34,018**		

After consideration, Mr. Yamamoto recommended that the JICA Team will consider supporting the study for a new WTP at Rainbow as Priority I project. Priority 1 on the above table will then be Priority II project while Priority 2 will be Priority III project for commercial financing. He requested the CETS to prepare the concept notes for Priority II and III projects and send to the JICA Team within the day.

AOB

The CETS expressed gratitude to the JICA Team for considering KIWASCO for the project and said they do not take it for granted. He said that they will share the information requested for with the JICA Team within the day and will continue working with the team.

There was no any other business and the meeting ended at 9.05 am.

SUBMISSIONS

For
Kisumu Water and Sanitation Company

_____
Eng. Moses Jura
Chief Engineer Technical Services
Kisumu Water and Sanitation Company
The Republic of Kenya

For
JICA TEAM

_____
Mr. Masayuki FUJII
Team Leader
JICA TEAM

Annex 1 : priority projects

Appendix - 4

Questionnaire for the 13 Candidate WSPs

(Electronic data only)

WSP-1

Embu WSP (EWASCO)

Project for Strengthening Capacity of Water Service Providers on Formulating Bankable Project Plans

Questionnaire (EWASCO)

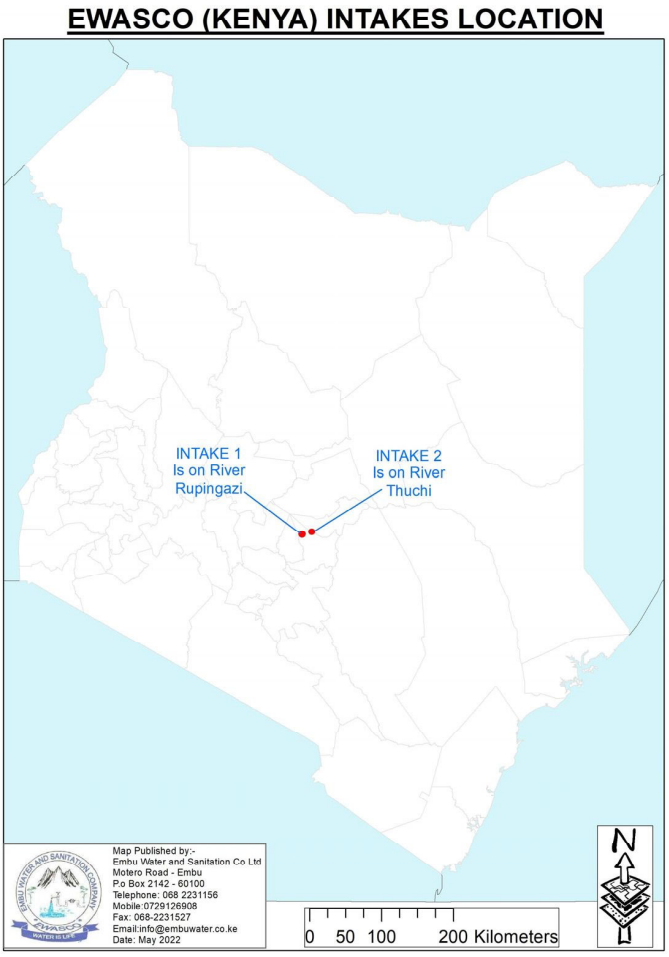
No.	Questions	Answers
1	Are you willing to borrow the money from commercial bank when selected as target WSP?	Yes.
2	Kindly specify last 10 years project with major project comportment and amount, and source of fund for each project.	• The OBA sewerage project work KES 450 million sourced from the Commercial bank • Kiambi JICA Grant for expanding Treatment works • 28 km lines extension Muthatari to Meka and Kiamuringa to Muchonoke • Muchonoke to Gangara Pipeline Tana Kithimu area expansion source
3	Kindly provide the WSP long term plan with annual budget for O&M and investment for water supply system.	【Strategic Plan 2021-2026】
4	Do you currently offer or intended to be offer any fund from doner, AOB, OBA, KPWF, own fund or any others? If yes, kindly provide the detail.	Yes. We have just submitted a proposal to WSTF for a KES 148 million for service improvement project.
5	Kindly provide the documents listed in Attachment 1 to 6 and Data Collection List.	【Strategic Plan 2021-2026】
6	Kindly fill in the details for the overview of water supply facilities as shown in Attachment 1 to 6.	【Attachment 1 to 6】
7	What is the reason for the inactive connections?	■ No payment □ No water due to technical problem such as no pressure, blockages and so on ■ There is any other alternative source. □ Deactivate the account during rainy season ■ Any other reason, if any please specify Customer's request for termination of account
8	What kind of sensitization for the inactive connections to reconnection have been carried out?	• Lipa pole (slow payment) initiative • Come we talk approach

No.	Questions	Answers
9	Kindly provide the current total water demand (m^3/day) with calculation method and excel file.	Nt (May 2022) = P (Jan 2022) x ert Nt = Future Population, P = Current Population e = Exponential, r = Population Growth Rate t = Time P (Jan 2022) x ert = Nt (May 2022) 236019 x 2.718(0.014x4/12) = 237,123 heads Water Demand = Population x Consumption Domestic Demand = 237,123x0.1 m^3/day Domestic Water Demand = 23,713 m^3/day For industries, irrigation and animals the estimated demand is 15,000 m^3/day Total Current Water Demand 38,713 m^3/day
10	Kindly provide the details for the water demand projection with calculation method and excel file.	$P_{(2022)}$ x e^{rt} = $Nt_{(2032)}$ 236,019 x $2.718^{(0.014x10)}$ = 27,149 m^3/day For industries, irrigation and animals the projected demand is 18,000 m^3/day Total Projected Water Demand 45,148 m^3/day
11	Challenges Faced in the Water Supply Facilities 1) Potential of Water Source	□ Enough to develop the future demand □ Enough for current demand ■ Not enough ■ Need additional water sources
	2) Raw Water Quality	□ Meet the standard for drinking purpose ■ Meeting the standard but deteriorating
	3) Intake Facility Intake Volume	□ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand
	Facility Condition	■ Good □ Fair □ Deteriorating but can utilize □ Need rehabilitation and augmentation

No.	Questions	Answers
	4) Raw Water Transmission System Transmission Volume Facility Condition	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand □ Good □ Fair ■ Deteriorating but can utilize □ Need rehabilitation and augmentation
	5) Water Treatment Plant Treatment Volume Facility Condition	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand □ Good □ Fair □ Deteriorating but can utilize ■ Need rehabilitation and augmentation
	6) Water Distribution Systems Water Pressure	 □ Meeting the standards for water pressure ■ Not all area meeting the standards for water pressure □ Not meeting the standard when high demand □ Not meeting the standard
	7) Household Connection	□ Using the saddle clamp with cock ■ Using the saddle clam ■ Using the tee
	8) Water Meter	■ Using the piston type □ Using propeller type Reason of selecting above: Its more accurate and also measures low volumes

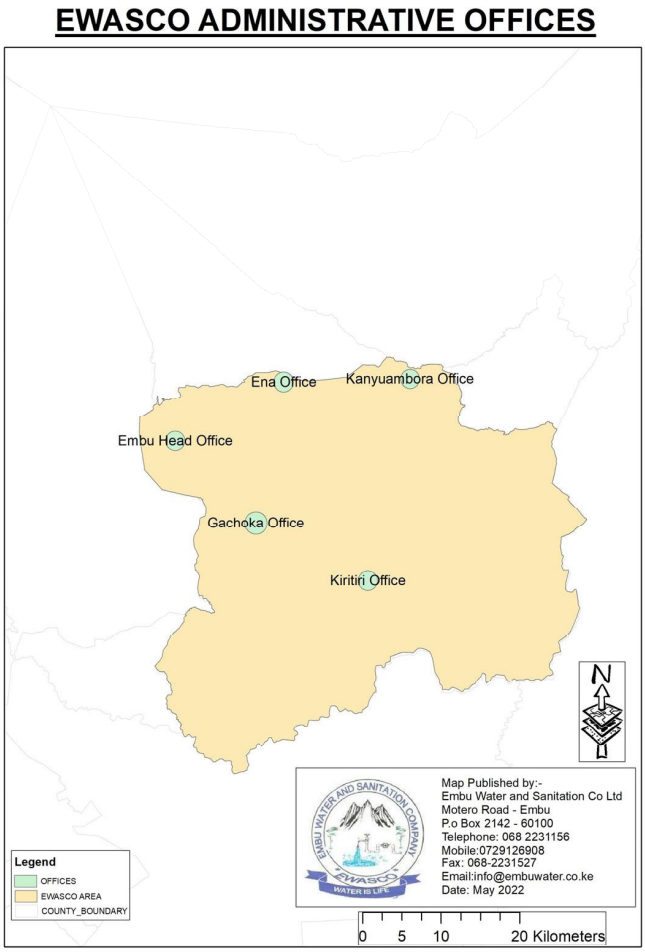
No.	Questions	Answers
	9) Non-Revenue Water (NRW) Reason and each percentage	 ■ Old pipe □ Poor material use ■ High pressure ■ Meter inaccuracy ■ Illegal connection ■ Poor workmanship □ Others
	10) Billing System How do you read the water meter?	 □ By manual ■ By smart Phone □ By smart meter
	What kind of software for billing system is using?	□ Enterprise Resource Planning (ERP) ■ JICS □ Other

Attachment-1: Main Water Source

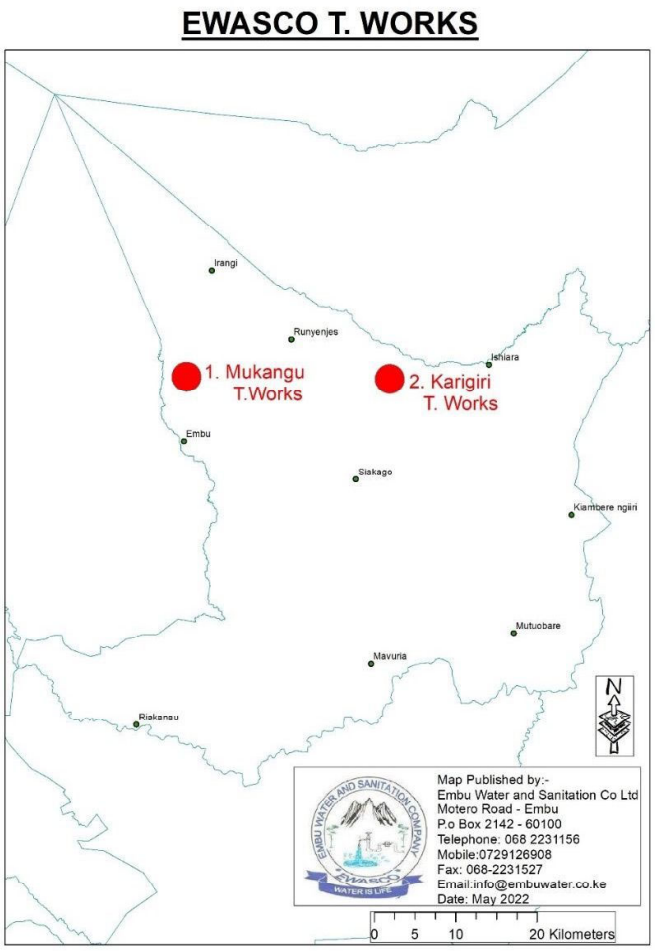
No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of water source and intake facility	① Rupingazi River Intake ② Thuchi River Intake 		
2	Specifications of water source and intake facility	① Rupingazi River Intake	• Water source capacity: 1.2 mil m^3/day • Intake capacity: 1,200 m^3/hour, 28,000 m^3/day • Year Built: Dec 2006 and upgraded in 2012 • Strcuture of intake facility (Elevation +1671 masl): ◆ Intake well: 2 m × 7 m × 15 m × 1 ◆ Grit chamber: 1.5 m × 1.5 m × 3 m ◆ Pump: N/A	

		② Thuchi River Intake	• Water source capacity: 1.2 mil m^3/day • Intake capacity: 500 m^3/hour, 12,000 m^3/day • Year Built: Dec 2010 • Structure of intake facility (Elevation +1614 masl): ◆ Intake well: 1.5 m × 8 m × 18 m × 1 ◆ Grit chamber: 1.5 m × 1.5 m × 3 m ◆ Pump: N/A	
3	Outstanding annual and seasonal fluctuation / trend, if any	N/A	• Maximum intake: 1,500 m^3/h, April in 2020 • Minimum intake: 500 m^3/h, October in 2020 • Permanent river or seasonal river: Permanent river	
4	Future development plan	N/A	【Strategic Plan 2021-2026】	

Attachment-2: Management Structure and Area of Coverage

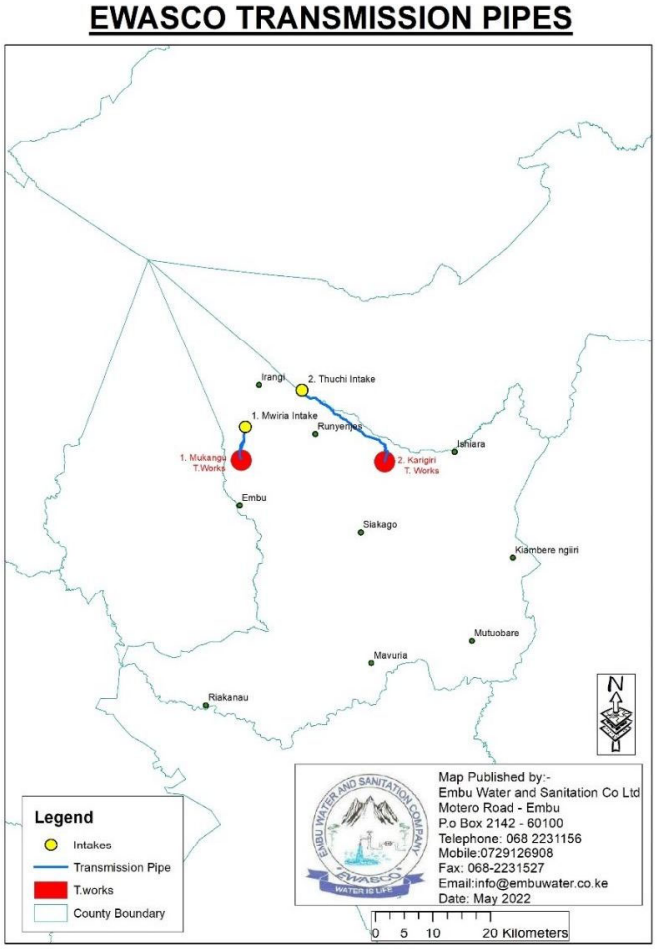
No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location of water supply area / county			
2	General information of water supply area / county	N/A	• Population / Beneficiaries (2022): 305,000 • Household connections (2022): 39,000 • Water Kiosk: 118 • Total / coverage area: (2022): 1,700 / 2,025 km^2 • Average service hours (2020): 18 hours • Water Treatment Plant: N/A • Main water source: N/A • Current domestic water demand: N/A • Future domestic water demand: 【Strategic Plan 2021-2026】	

Attachment-3: Water Treatment Plant (WTP)

<table>
<tr><th>No.</th><th>Items</th><th colspan="2">Details / Numbers / Specifications / Conditions</th><th>Note</th></tr>
<tr><td>1</td><td>Name and location map of WTP</td><td colspan="2">① Mukangu WTP
② Karigiri WTP
 
</td><td></td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Specifications of WTP</td><td>① Mukangu WTP</td><td>• Type of treatment: Conventional treatment process with Coagulation, flocculation, sedimentation, aeration, rapid sand filtration + disinfection
• Current treatment capacity: 28,000 m^3/day
• Design treatment capacity: 28,000 m^3/day
• Year Built: March, 2012
• Structure of main facility: N/A</td><td></td></tr>
<tr><td>② Karigiri WTP</td><td>N/A</td><td></td></tr>
</table>

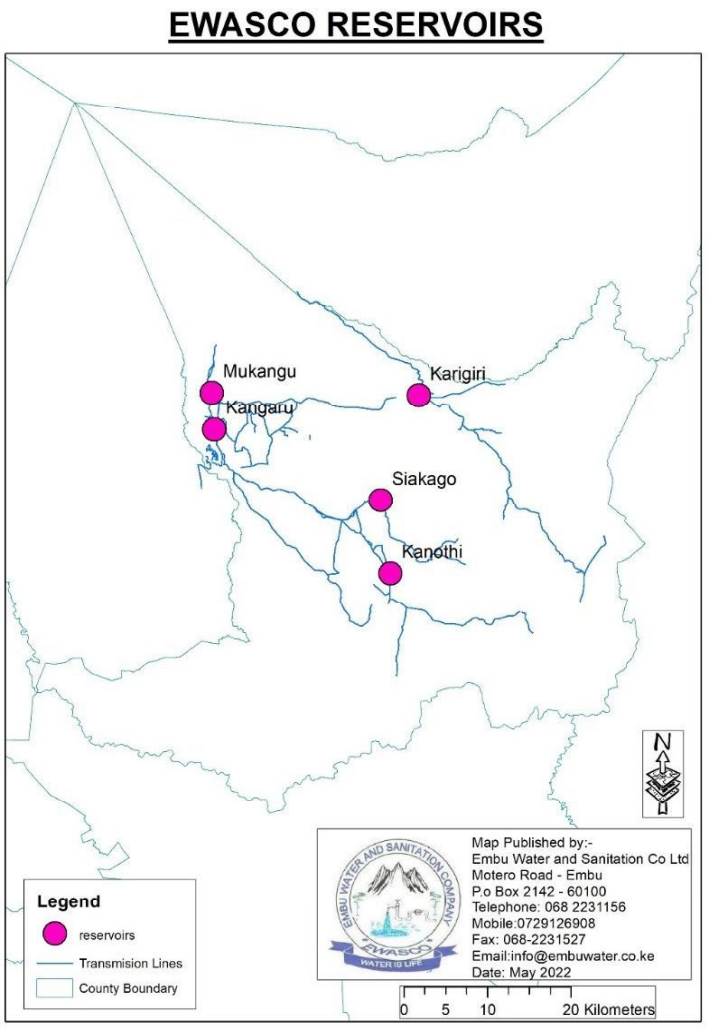
3	Water treatment conditions	① Mukangu WTP	• Utilization of plant capacity: 85 % • Hours for WTP Utilization: 24 • Flow diagram of the water treatment process: N/A • Type and amount of chemicals used during the process (2020) for during the dry and rainy seasons: ◆ PAC: 350 kg/day ◆ Sodium hypochlorite: 30 kg/day ◆ Concentrated sulfuric acid: 550 kg/day ◆ Lime: 60 kg/day • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor cost: N/A ◆ Chemical cost: N/A ◆ Electricity cost: N/A ◆ Maintenance cost: N/A ◆ Other cost: N/A	
		② Karigiri WTP	N/A	
4	Water quality test	① Mukangu WTP	• Main items to be tested in each process and frequency of the test (raw water, after treatment and so on): Refer to Table 1. • Compliance with water quality standards: Refer to Table 2.	
		② Karigiri WTP	N/A	
5	Future development plan	N/A	【Strategic Plan 2021-2026】	

Attachment-4: Water Transmission Mains to Reservoir

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of transmission pipeline			
2	Specifications of Pipeline	Whole	• Location, materials, diameter and length of each pipeline Refer to Table 3. • Year Built: for each pipeline: N/A • NRW of main transmission line: 5% • Transmission pump: N/A	
3	Future development plan	N/A	【Strategic Plan 2021-2026】	

Attachment-5: Reservoirs

No.	Items	Details / Numbers / Specifications / Conditions	Note
1	Name and location map of Reservoir	① Mukangu Reservoir ② Karigiri Reservoir ③ Kangaru Reservoir ④ Siakago Reservoir ⑤ Kanothi Reservoir	



2	Specifications of reservoir	① Mukangu Reservoir ② Karigiri Reservoir ③ Kangaru Reservoir ④ Siakago Reservoir ⑤ Kanothi Reservoir	• Current capacity: N/A • Year Built: N/A • Structure of main facility: ◆ Reservoir: N/A ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A	
3	Operation and maintenance and Water quality test	① Mukangu Reservoir ② Karigiri Reservoir ③ Kangaru Reservoir ④ Siakago Reservoir ⑤ Kanothi Reservoir	• Flow diagram of reservoir: N/A • Type and amount of chemicals used before distribution if any: N/A ◆ Sodium hypochlorite: N/A • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor / maintenance cost: N/A ◆ Electricity cost: N/A ◆ Other cost: N/A • Main items to be tested in reservoir: N/A • Compliance with water quality standards: N/A	
4	Future development plan	N/A	N/A	

Attachment-6: Water Distribution Mains

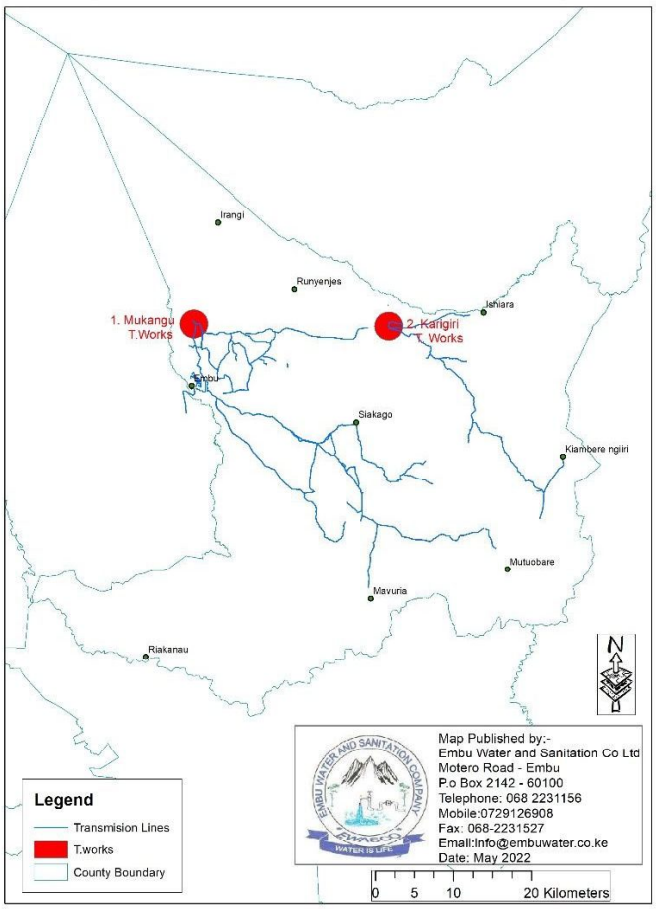
No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of distribution pipeline network			
2	Specifications of Pipeline	N/A	• Location, materials, diameter and length of each pipeline Refer to Table 4. • Year Built: for each pipeline: N/A • Distribution pump: N/A • NRW of main distribution line: N/A	
3	Future development plan	N/A	N/A	

Table 1 Water Quality

PARAMETER	UNITS	PROCESS	FREQUENCY	KENYA STANDARD (Maximum)
Turbidity	NTU	Raw, Treated	Bi-hourly	5
		Clarified, Filtered	Twice /Day	
		Consumer points	Twice/ week	
PH	-	Raw, Treated	Bihourly	6.5 -8.5
		Clarified, Filtered	Twice /Day	
		Consumer points	Twice/ week	
Temperature	℃	Raw, Treated	Bihourly	-
		Clarified, Filtered	Twice /Day	
		Consumer points	Twice/ week	
Color	PCU	Raw, Treated	Bihourly	15
		Clarified, Filtered	Twice /Day	
		Consumer points	Twice/ week	
Total Dissolved units	mg/L	Raw, Treated	Bihourly	1000
		Clarified, Filtered	Twice /Day	
		Consumer points	Twice/ week	
Total Hardness	mg/L	Raw, Treated	Twice /Day	300
		Consumer points	Twice/ week	
Magnesium	mg/L	Raw, Treated	Twice /Day	100
		Consumer points	Twice/ week	
Residual Chlorine	mg/L	Treated	Twice /Day	0.2
		Consumer points	Twice/ week	
Fecal Coliform	MPN/100ML	Treated	Once /Day	Not detectable
		Consumer points	Twice/ week	
Nitrate	mg/L	Raw, Treated	Twice /Day	50
		Consumer points	Twice/ week	

Source：EWASCO

Table 2 Compliance with Water Quality Standards

EWASCO Network	No. of tests	No. of tests conducted	No. of tests within Kenya Standards
Residual Chlorine	900	1,390	956
Bacteriological	372	474	450
PH & Turbidity	480	2,772	2,718
Other physiochemical tests	92	478	478

Source：EWASCO

Table 3 Transmission Pipe

EWASCO TRANSMISSION PIPE LENGTHS BREAKDOWN (METERS)							
SIZE (mm)	G.I	D.I	P.V.C	H.D.P.E	SHARE	TOTAL	YEAR
DN500		5,887			1.29	**5,887**	2010 to 2012
DN355			5,900.00		1.30	**5,900**	2007 to 2010
DN200	218		22,036		4.89	**22,254**	2010 to 2012

Source：EWASCO

Table 4 Distribution Pipe

EWASCO TRANSMISSION PIPE LENGTHS BREAKDOWN (METERS)							
SIZE (mm)	G.I	D.I	P.V.C	H.D.P.E	SHARE	TOTAL	YEAR
DN315	18		39,296		8.64	**39,314**	2010 to 2012
DN250	54		9,337		2.06	**9,391**	2010 to 2012
DN225	107		53,118		11.70	**53,225**	2010 to 2012
DN160	314		136,842	4,012	31.02	**141,168**	1973, 2010 to 2012
DN110	334		67,750	4,012	15.84	**72,096**	1973, 2010 to 2012
DN90	356		95,403	10113	23.26	**105,872**	1973, 2010 to 2012
TOTALS	1,183	-	401,746	18,137	92.52	**421,066**	

Source：EWASCO

WSP-2

Meru WSP (MEWASS)

Project for Strengthening Capacity of Water Service Providers on Formulating Bankable Project Plans

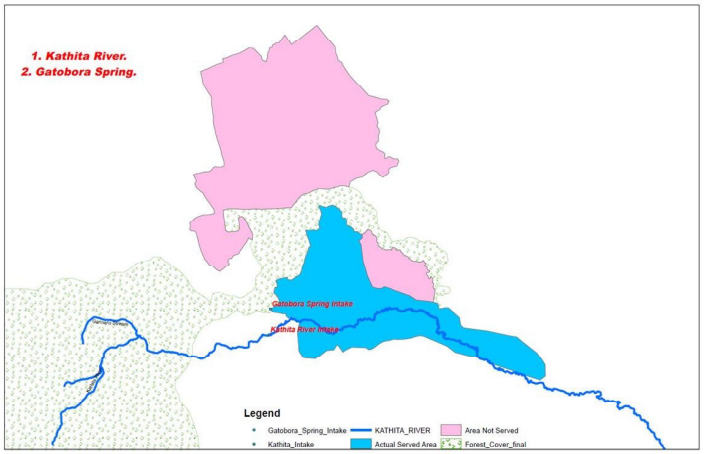
Questionnaire (MEWASS)

No.	Questions	Answers
1	Are you willing to borrow the money from commercial bank when selected as target WSP?	Yes.
2	Kindly specify last 10 years project with major project comportment and amount, and source of fund for each project.	N/A
3	Kindly provide the WSP long term plan with annual budget for O&M and investment for water supply system.	N/A
4	Do you currently offer or intended to be offer any fund from doner, AOB, OBA, KPWF, own fund or any others? If yes, kindly provide the detail.	N/A
5	Kindly provide the documents listed in Attachment 1 to 6 and Data Collection List.	N/A
6	Kindly fill in the details for the overview of water supply facilities as shown in Attachment 1 to 6.	【Attachment 1 to 6】
7	What is the reason for the inactive connections?	□ No payment □ No water due to technical problem such as no pressure, blockages and so on □ There is any other alternative source. □ Deactivate the account during rainy season □ Any other reason, if any please specify
8	What kind of sensitization for the inactive connections to reconnection have been carried out?	N/A
9	Kindly provide the current total water demand (m^3/day) with calculation method and excel file.	N/A
10	Kindly provide the details for the water demand projection with calculation method and excel file.	N/A
11	Challenges Faced in the Water Supply Facilities 1) Potential of Water Source	□ Enough to develop the future demand □ Enough for current demand □ Not enough □ Need additional water sources

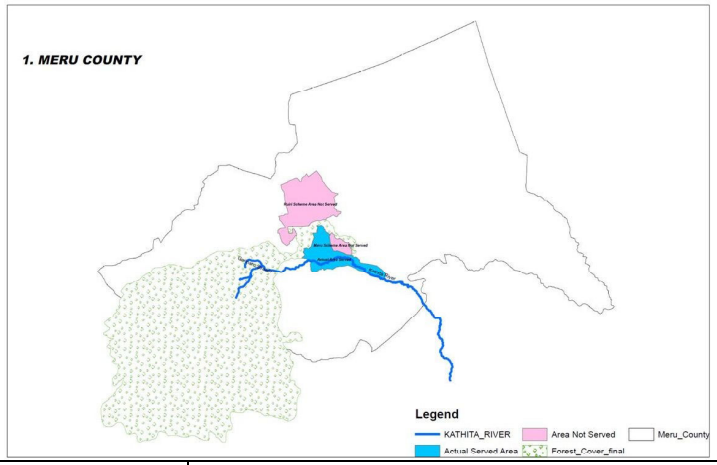
No.	Questions	Answers
	2) Raw Water Quality	□ Meet the standard for drinking purpose □ Meeting the standard but deteriorating
	3) Intake Facility Intake Volume	□ Sufficient for future water demand □ Sufficient for current demand □ Not sufficient for current demand
	Facility Condition	□ Good □ Fair □ Deteriorating but can utilize □ Need rehabilitation and augmentation
	4) Raw Water Transmission System Transmission Volume	□ Sufficient for future water demand □ Sufficient for current demand □ Not sufficient for current demand
	Facility Condition	□ Good □ Fair □ Deteriorating but can utilize □ Need rehabilitation and augmentation
	5) Water Treatment Plant Treatment Volume	□ Sufficient for future water demand □ Sufficient for current demand □ Not sufficient for current demand
	Facility Condition	□ Good □ Fair □ Deteriorating but can utilize □ Need rehabilitation and augmentation
	6) Water Distribution Systems Water Pressure	□ Meeting the standards for water pressure □ Not all area meeting the standards for water pressure □ Not meeting the standard when high demand □ Not meeting the standard

No.	Questions	Answers
	7) Household Connection	□ Using the saddle clamp with cock □ Using the saddle clam □ Using the tee
	8) Water Meter	□ Using the piston type □ Using propeller type Reason of selecting above:
	9) Non-Revenue Water (NRW) Reason and each percentage	□ Old pipe □ Poor material use □ High pressure □ Meter inaccuracy □ Illegal connection □ Poor workmanship □ Others
	10) Billing System How do you read the water meter? What kind of software for billing system is using?	□ By manual □ By smart Phone □ By smart meter □ Enterprise Resource Planning (ERP) □ JICS □ Other

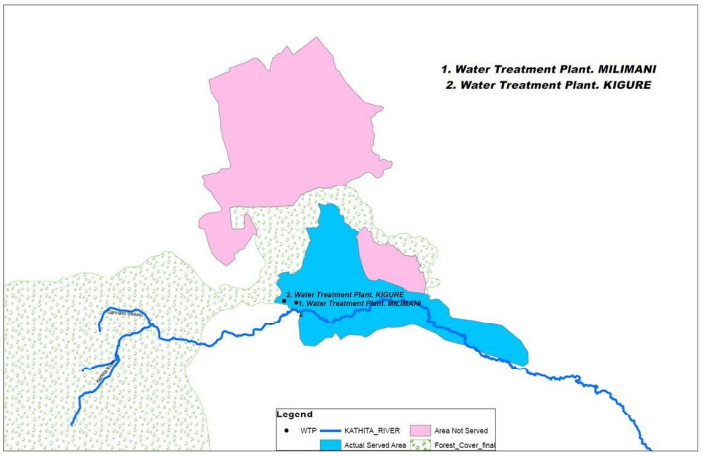
Attachment-1: Main Water Source

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of water source and intake facility	① Kathita River ② Gatobora Spring 		
2	Specifications of water source and intake facility	① Kathita River ② Gatobora Spring	• Water source capacity: N/A m^3/day • Intake capacity: N/A m^3/hour, N/A m^3/day • Year Built: N/A • Strcuture of intake facility (Elevation + N/A masl): ◆ Intake well: N/A ◆ Grit chamber: N/A ◆ Pump: N/A	
3	Outstanding annual and seasonal fluctuation / trend, if any	N/A	• Maximum intake: N/A • Minimum intake: N/A • Permanent river or seasonal river: N/A	
4	Future development plan	N/A	N/A	

Attachment-2: Management Structure and Area of Coverage

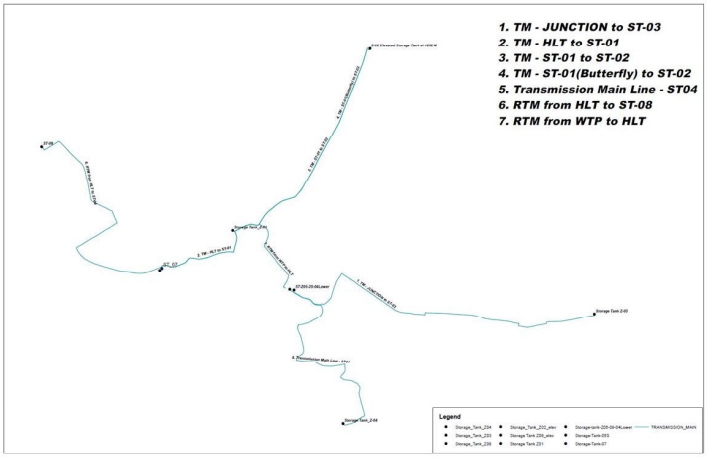
No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location of water supply area / county	① Meru County 		
2	General information of water supply area / county	① Meru County	• Population / Beneficiaries: N/A • Household connections: N/A • Water Kiosk: N/A • Total / coverage area: N/A km^2 • Average service hours: N/A • Water Treatment Plant: N/A • Main water source: N/A • Current domestic water demand: N/A • Future domestic water demand: N/A	

Attachment-3: Water Treatment Plant (WTP)

No.	Items	Details / Numbers / Specifications / Conditions	Note
1	Name and location map of WTP	① Milimani WTP ② Kigure WTP 	

<table>
<tr><td>2</td><td>Specifications of WTP</td><td>① Milimani WTP
② Kigure WTP</td><td>• Type of treatment: N/A
• Current treatment capacity: N/A m^3/day
• Design treatment capacity: N/A m^3/day
• Year Built: N/A
• Structure of main facility: N/A</td><td></td></tr>
<tr><td>3</td><td>Water treatment conditions</td><td>① Milimani WTP
② Kigure WTP</td><td>• Utilization of plant capacity: N/A %
• Hours for WTP Utilization: N/A
• Flow diagram of the water treatment process: N/A
• Type and amount of chemicals used during the process for during the dry and rainy seasons:
◆ PAC: N/A kg/day
◆ Sodium hypochlorite: N/A kg/day
◆ Concentrated sulfuric acid: N/A kg/day
◆ Lime: N/A kg/day
• Annual Operation and maintenance cost and its breakdown: N/A
◆ Labor cost: N/A
◆ Chemical cost: N/A
◆ Electricity cost: N/A
◆ Maintenance cost: N/A
◆ Other cost: N/A</td><td></td></tr>
<tr><td>4</td><td>Water quality test</td><td>① Milimani WTP
② Kigure WTP</td><td>• Main items to be tested in each process and frequency of the test (raw water, after treatment and so on): N/A
• Compliance with water quality standards:
<table><tr><th>Parameter</th><th>Compliance (%)</th></tr><tr><td>Residue Chlorine</td><td>100.00</td></tr><tr><td>Bacteriologicals Tests</td><td>100.00</td></tr><tr><td>pH</td><td>100.00</td></tr><tr><td>Colour</td><td>99.94</td></tr><tr><td>Turbidity</td><td>90.70</td></tr><tr><td>Alkalinity</td><td>100.00</td></tr><tr><td>Chemical</td><td>100.00</td></tr></table></td><td></td></tr>
<tr><td>5</td><td>Future development plan</td><td>N/A</td><td>N/A</td><td></td></tr>
</table>

Attachment-4: Water Transmission Mains to Reservoir

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of transmission pipeline	① Junction to ST-03 ② HLT to ST-01 ③ ST-01 to ST-02 ④ ST-01 (Butterfly) to ST-02 ⑤ ST-04 ⑥ HLT to ST-08 ⑦ WTP - HLT 		
2	Specifications of Pipeline	① Junction to ST-03 ② HLT to ST-01 ③ ST-01 to ST-02 ④ ST-01 (Butterfly) to ST-02 ⑤ ST-04 ⑥ HLT to ST-08 ⑦ WTP - HLT	• Location, materials, diameter and length of each pipeline: N/A • Year Built: for each pipeline: N/A • NRW of main transmission line: 5% • Transmission pump: N/A	
3	Future development plan	N/A	N/A	

Attachment-5: Reservoirs

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of Reservoir	N/A		
2	Specifications of reservoir	N/A	• Current capacity: Refer to Table 1. • Year Built: Refer to Table 1. • Structure of main facility: ◆ Reservoir: N/A ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A	
3	Operation and maintenance and Water quality test	N/A	• Flow diagram of reservoir: N/A • Type and amount of chemicals used before distribution if any: N/A ◆ Sodium hypochlorite: N/A • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor / maintenance cost: N/A ◆ Electricity cost: N/A ◆ Other cost: N/A • Main items to be tested in reservoir: N/A • Compliance with water quality standard: N/A	
4	Future development plan	N/A	N/A	

Attachment-6: Water Distribution Mains

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of distribution pipeline network	N/A		
2	Specifications of Pipeline	N/A	• Location, materials, diameter and length of each pipeline: N/A • Year Built: for each pipeline: N/A • Distribution pump: N/A • NRW of main distribution line: N/A	
3	Future development plan	N/A	N/A	

Table 1 MEWASS Storage Facilities

MEWASS STORAGE FACILITIES				
Location (area)	**Type**	**Year of installation**	**Capacity (m^3)**	**In use/not in use (reason)**
Milimani	Reinforced Concrete	2017	500	In use
Milimani	Masonry	1985	455	In use
Milimani	Masonry	1985	395	In use
Milimani	Masonry	1985	91	In use
Milimani	Elevated Steel Tank	2003	80	In use
Kigure	Elevated Steel Tank	2003	150	In use
Kigure	Masonry	2016	80	In use
Kigure	Masonry	1985	215	In use
Kigure	Masonry	1985	215	In use
Irinda	Reinforced Concrete	2003	242	In use
Gakoromone	Reinforced Concrete	2003	242	In use
Kaaga	Elevated Steel Tank	200	170	In use
Kenya Re	Masonry	1992	1000	In use
Kinoru	Reinforced Concrete	2003	988	In use
Giaki	Masonry	2016	125	In use
TOTAL			4,868.00	

Source：MEWASS

WSP-3

Ngagaka WSP (NGAWASCO)

Project for Strengthening Capacity of Water Service Providers on Formulating Bankable Project Plans

Questionnaire (NGAWASCO)

No.	Questions	Answers
1	Are you willing to borrow the money from commercial bank when selected as target WSP?	Yes
2	Kindly specify last 10 years project with major project comportment and amount, and source of fund for each project.	• Irangi Pipeline (CDF & NGAWASCO, KES 70 million) Intake:14 km transmission main (DN 250), Distribution:10km (DN 160) ,11.2 km (DN 100) and 110.6 km (DN 20 – 75)
3	Kindly provide the WSP long term plan with annual budget for O&M and investment for water supply system.	【Strategic Plan 2019-2024】
4	Do you currently offer or intended to be offer any fund from doner, AOB, OBA, KPWF, own fund or any others? If yes, kindly provide the detail.	No.
5	Kindly provide the documents listed in Attachment 1 to 6 and Data Collection List.	Noted.
6	Kindly fill in the details for the overview of water supply facilities as shown in Attachment 1 to 6.	【Attachment 1 to 6】
7	What is the reason for the inactive connections?	■ No payment □ No water due to technical problem such as no pressure, blockages and so on ■ There is any other alternative source. □ Deactivate the account during rainy season ■ Any other reason, if any please specify Disconnection on owner's request
8	What kind of sensitization for the inactive connections to reconnection have been carried out?	• Customer's negotiated agreement with structured payment to offset arrears and paying current bill.
9	Kindly provide the current total water demand (m^3/day) with calculation method and excel file.	Current total water demand: 8,100 m^3/day
10	Kindly provide the details for the water demand projection with calculation method and excel file.	N/A

No.	Questions	Answers
11	Challenges Faced in the Water Supply Facilities 1) Potential of Water Source	■ Enough to develop the future demand □ Enough for current demand □ Not enough □ Need additional water sources
	2) Raw Water Quality	□ Meet the standard for drinking purpose ■ Meeting the standard but deteriorating
	3) Intake Facility Intake Volume Facility Condition	 ■ Sufficient for future water demand □ Sufficient for current demand □ Not sufficient for current demand □ Good ■ Fair □ Deteriorating but can utilize □ Need rehabilitation and augmentation
	4) Raw Water Transmission System Transmission Volume Facility Condition	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand □ Good □ Fair □ Deteriorating but can utilize ■ Need rehabilitation and augmentation
	5) Water Treatment Plant Treatment Volume Facility Condition	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand □ Good □ Fair □ Deteriorating but can utilize ■ Need rehabilitation and augmentation

No.	Questions	Answers
	6) Water Distribution Systems Water Pressure	□ Meeting the standards for water pressure ■ Not all area meeting the standards for water pressure ■ Not meeting the standard when high demand □ Not meeting the standard
	7) Household Connection	■ Using the saddle clamp with cock □ Using the saddle clam ■ Using the tee (with cock)
	8) Water Meter	■ Using the piston type ■ Using propeller type Reason of selecting above: Water contains silt and debris.
	9) Non-Revenue Water (NRW) Reason and each percentage	■ Old pipe ■ Poor material use ■ High pressure ■ Meter inaccuracy ■ Illegal connection □ Poor workmanship □ Others
	10) Billing System How do you read the water meter? What kind of software for billing system is using?	□ By manual ■ By smart Phone □ By smart meter □ Enterprise Resource Planning (ERP) □ JICS ■ Other: Maji Voice

Attachment-1: Main Water Source

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of water source and intake facility	① Thambana River		Inside Mt. Kenya forest
2	Specifications of water source and intake facility	① Thambana River (1982) ② Kathambana River (2012)	• Water source capacity: N/A ㎥/day • Intake capacity: 663 ㎥/hour, 15,912 ㎥/day • Year Built: 1982 and 2012 • Structure of intake facility (Elevation +1,951m and 2,081 masl): ◆ Intake weir: 1 m × 1.5 m × 15 m × 2 no. (Reinforced concrete) ◆ Grit chamber: N/A ◆ Pump: N/A	
3	Outstanding annual and seasonal fluctuation / trend, if any	Thambana River and Kathambana River	• Maximum intake: N/A • Minimum intake: N/A • Permanent river or seasonal river: Permanent river	
4	Future development plan	N/A	N/A	

Attachment-2: Management Structure and Area of Coverage

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location of water supply area / county	① Ngagaka Water Supply Embu County serving Ngandori, Gaturi & Kagaari locations.		
2	General information of water supply area / county	Ngagaka, Embu County	• Population / Beneficiaries (2020): 76,000 • Household connections (2022): 11,120 • Water Kiosk: N/A • Total / coverage area: (2022): 80 ㎢ • Average service hours (2020): 23 hours • Water Treatment Plant: Kathuniri WTP • Main water source: Thambana River and Kathambana River • Current domestic water demand (2022): 8,100 m^3/day • Future domestic water demand (2032): 10,213.8 ㎥/day	

Attachment-3: Water Treatment Plant (WTP)

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of WTP	① Kathuniri WTP ② Proposed Irangi WTP		
2	Specifications of WTP	① Kathuniri WTP	• Type of treatment: Partial treatment with baffled sedimentation + chlorine disinfection • Current treatment capacity (2022): 6,048 ㎥/day • Design treatment capacity (2022): 6,825 ㎥/day • Year Built: 1982 • Structure of main facility Sedimentation basin: 100 ㎥, 8 m× 8 m× 1.8 m, Baffled, RC Retention raw water tank: 225 ㎥, 10.7 m diameter, masonary	
3	Water treatment conditions	① Kathuniri WTP	• Utilization of plant capacity: 89 % • Hours for WTP Utilization: 24 • Flow diagram of the water treatment process: Sedimentation/Chlorination/Transmission/ Distribution	

			• Type and amount of chemicals used during the process (2020) for during the dry and rainy seasons: ◆ PAC: N/A ◆ Sodium hypochlorite: 6.5 kg/day ◆ Concentrated sulfuric acid: N/A ◆ Lime: N/A • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor cost: N/A ◆ Chemical cost: N/A ◆ Electricity cost: N/A ◆ Maintenance cost: N/A ◆ Other cost: N/A	
4	Water quality test	① Kathuniri WTP	• Main items to be tested in each process and frequency of the test (raw water, after treatment and so on): N/A • Compliance with water quality standards: N/A	
5	Future development plan	① IRANGI WTP	• Treatment capacity: 6,912 ㎥/day (Additional) • Target year: 2023 • Purpose: Reduce the loads of existing facility and to boost the water supply within Runyenjes Town to meet the demand in year 2032	

Attachment-4: Water Transmission Mains to Reservoir

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of transmission pipeline	① Kathuniri gravity transmission line ② Irangi gravity transmission line		
2	Specifications of Pipeline	① Kathuniri line	• Location, materials, diameter and length of each pipeline Refer to Table 1. • Year Built: for each pipeline: 1982 • NRW of main transmission line: N/A • Transmission pump: N/A	
		② Irangi line	• Location, materials, diameter and length of each pipeline Refer to Table 2. • Year Built: for each pipeline: 2012 • NRW of main transmission line: N/A • Transmission pump: N/A	
3	Future development plan	① Irangi line	• Location, materials, diameter and length of each pipeline (additional / reconstruction) (Please let us know by table.) • Scheduled year: 2023 • Purpose: To boost the water supply within Runyenjes Town to meet the demand in year 2032 and constructed in same period with Irangi WTP	

Attachment-5: Reservoirs

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of Reservoir	① Kathande Tanks ② Kathangari Tanks ③ Kigumo Tank		
2	Specifications of reservoir	① Kathande Tanks	• Current capacity: 100 ㎥ • Year Built: 1992 • Structure of main facility: ◆ Reservoir Type: Ground Material: Masonry Size: 50 ㎥, ×2 no. ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A	
		② Kathangari Tanks	• Current capacity: 150 ㎥ • Year Built: 1992 • Structure of main facility: ◆ Tank Type: Ground Material: Masonry Size: 50 ㎥, ×3 no. ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A	
		③ Kigumo Tank	• Current capacity: 50 ㎥ • Year Built: 1992 • Structure of main facility: ◆ Tank Type: Ground Material: Masonry Size: 50 ㎥, ×1 no. ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A	
3	Operation and maintenance and Water quality test	① Kathande Tanks	• Flow diagram of reservoir: N/A • Type and amount of chemicals used before distribution if any: N/A	

			◆ Sodium hypochlorite: N/A • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor / maintenance cost: N/A ◆ Electricity cost: N/A ◆ Other cost: N/A • Main items to be tested in reservoir: Chlorine residual • Compliance with water quality standards: N/A	
		② Kathangari Tanks	Ditto	
		③ Kigumo Tank	Ditto	
4	Future development plan	① Wanjira Tank	• Design capacity : 225 ㎥ ×2no. , RC (Steel) • Scheduled year: 2024 • Purpose: retaining 450 ㎥ to boost the service hour within Kevote and Kavutiri Market Centres to meet the demand in year 2032.	

Attachment-6: Water Distribution Mains

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of distribution pipeline network	① Ngagaka distribution network		
2	Specifications of Pipeline	① Ngagaka lines	• Location, materials, diameter and length of each pipeline (Refer to Table 3.) • Year Built: for each pipeline: N/A • Distribution pump: N/A • NRW of main distribution line: N/A	
3	Future development plan	① Runyenjes lines	• Location, materials, diameter and length of each pipeline (additional). (Please let us know by table.) • Scheduled year: 2023～2024 • Purpose: To boost the water supply within Runyenjes Town to meet demand in 2032	

Table 1 Transmission Lines (Kathuniri Line)

Transmission Lines				
Diameter (mm)	HDPE	PVC	ST	Total (km)
250	-	1.1	-	1.1

Source：NGAWASCO

Table 2 Transmission Lines (Irangi Line)

Transmission Lines				
Diameter (mm)	HDPE	PVC	ST	Total (km)
250	-	14.0	-	14.0

Source：NGAWASCO

Table 3 Distribution Lines (Ngagaka Line)

Distribution Lines					
Diameter (mm)	Year built.	HDPE	PVC	ST	Total (km)
250	1982	-	5.5	-	5.5
200	1982/2012	-	6.1	-	6.1
160	2012	-	10	-	10.0
100	1982/2012	-	24.5	-	24.5
less than 100	2022/1982/2012	2.0	462.8	-	482.8
SUM		2.0	508.9	-	510.9

Source：NGAWASCO

WSP-4

Murang’a WSP (MUWASCO)

Project for Strengthening Capacity of Water Service Providers on Formulating Bankable Project Plans

Questionnaire (MUWASCO)

No.	Questions	Answers
1	Are you willing to borrow the money from commercial bank when selected as target WSP?	Yes
2	Kindly specify last 10 years project with major project comportment and amount, and source of fund for each project.	• Murang'a Urban Water Supply Project (Tana WWDA / African Development Bank) Irati intake: 15 km, steel raw water main (DN 350), 15,000 m^3/day and clear water transmission mains Sewerage extension project including Maturation ponds: KES 175 million Water component: KES 514 million
3	Kindly provide the WSP long term plan with annual budget for O&M and investment for water supply system.	【MUWASCO Budget Long-term Plan】
4	Do you currently offer or intended to be offer any fund from doner, AOB, OBA, KPWF, own fund or any others? If yes, kindly provide the detail.	Yes. AoD application to WSTF done (KES 149 million)
5	Kindly provide the documents listed in Attachment 1 to 6 and Data Collection List.	Noted.
6	Kindly fill in the details for the overview of water supply facilities as shown in Attachment 1 to 6.	【Attachment 1 to 6】
7	What is the reason for the inactive connections?	■ No payment ■ No water due to technical problem such as no pressure, blockages and so on ■ There is any other alternative source. □ Deactivate the account during rainy season □ Any other reason, if any please specify
8	What kind of sensitization for the inactive connections to reconnection have been carried out?	• Public Baraza • Telephone calls
9	Kindly provide the current total water demand (m^3/day) with calculation method and excel file.	Total Current Water Demand: 28,820 m^3/day Current Supply Area 15,000 m^3/day
10	Kindly provide the details for the water demand projection with calculation method and excel file.	2030: 33,962 m^3/day 2040: 41,715 m^3/day 2050: 51,259 m^3/day

No.	Questions	Answers
11	Challenges Faced in the Water Supply Facilities 1) Potential of Water Source	□ Enough to develop the future demand □ Enough for current demand □ Not enough ■ Need additional water sources
	2) Raw Water Quality	■ Meet the standard for drinking purpose □ Meeting the standard but deteriorating
	3) Intake Facility Intake Volume Facility Condition	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand □ Good ■ Fair □ Deteriorating but can utilize □ Need rehabilitation and augmentation
	4) Raw Water Transmission System Transmission Volume Facility Condition	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand □ Good ■ Fair □ Deteriorating but can utilize □ Need rehabilitation and augmentation
	5) Water Treatment Plant Treatment Volume Facility Condition	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand □ Good ■ Fair □ Deteriorating but can utilize □ Need rehabilitation and augmentation

No.	Questions	Answers
	6) Water Distribution Systems Water Pressure	□ Meeting the standards for water pressure ■ Not all area meeting the standards for water pressure □ Not meeting the standard when high demand □ Not meeting the standard
	7) Household Connection	■ Using the saddle clamp with cock □ Using the saddle clam □ Using the tee
	8) Water Meter	■ Using the piston type □ Using propeller type Reason of selecting above: Accuracy
	9) Non-Revenue Water (NRW) Reason and each percentage	■ Old pipe □ Poor material use ■ High pressure ■ Meter inaccuracy ■ Illegal connection □ Poor workmanship □ Others
	10) Billing System How do you read the water meter? What kind of software for billing system is using?	□ By manual ■ By smart Phone □ By smart meter ■ Enterprise Resource Planning (ERP) □ JICS □ Other

Attachment-1: Main Water Source

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of water source and intake facility	① Irati River ② Kayahwe River		
2	Specifications of water source and intake facility	① Irati River	• Water source capacity: 10,000 ㎥/day • Intake capacity: 625 ㎥/hour, 15,000 ㎥/day • Year Built: 2013 (ADB) • Structure of intake facility (Elevation +1,562 masl): ◆ Intake well: 16 m × 2 m × 3 m × 1 (Mass Concrete) ◆ Grit chamber: N/A ◆ Pump: N/A	
		② Kayahwe River	• Water source capacity: 10,000 ㎥/day • Intake capacity: 208 ㎥/hour, 5,000 ㎥/day • Year Built: 1975 • Structure of intake facility (Elevation +1,345 masl): ◆ Intake well: 16 m × 2 m × 3 m × 1 (Mass Concrete) ◆ Grit chamber: N/A ◆ Pump: N/A	
3	Outstanding annual and seasonal fluctuation / trend, if any	N/A	• Maximum intake: N/A • Minimum intake: N/A • Permanent river or seasonal river: N/A	
4	Future development plan	① Kayahwe River	• Intake capacity: 5,000 ㎥/day (Additional) • New raw water main approx. 100 m in length (DN 300) to the existing plus expansion of the current treatment works • Scheduled year: 2023 • Purpose: To boost the water supply within Murang'a Town https://goo.gl/maps/GxyaTyZSQ4d63MJM6	

		② Mathioya N. River	• Intake capacity: 25,000 ㎥/day (New) • Scheduled year: 2024-2027 • Purpose: To increase the water supply, reliability and coverage to the New Murang'a Municipality that covers 330 km^2 against the current coverage of 145 km^2 • https://goo.gl/maps/nGAkthMkYSP3Npsg9	

Attachment-2: Management Structure and Area of Coverage

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location of water supply area / county	① Murang'a Municipality / Murang'a County Refer to Figure 1.		
2	General information of water supply area / county	① Muranga'a Municipality	• Population / Beneficiaries (2020): 102,000 • Household connections (2022): 16,000 (active) • Water Kiosk: 4 • Total / coverage area: (2022): 145 km^2 • Average service hours (2020):18 hours • Water Treatment Plant: Kiawambeu WTP • Main water source: Irati River • Current domestic water demand (year 2022): 28,820 ㎥/day • Future domestic water demand (year 2040): 41,715 ㎥/day	

Attachment-3: Water Treatment Plant (WTP)

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of WTP	① Kiawambeu WTP ② Kayahwe WTP		
2	Specifications of WTP	① Kiawambeu WTP	• Type of treatment: Rapid filtration with coagulation + chlorine disinfection • Current treatment capacity (Year 2022): 15,000 m³/day • Design treatment capacity (Year 2022): 15,000 m³/day • Year Built: 2014 • Structure of main facility: • Receiving well: 4 m³, 1 m × 2 m × 2 m × 1 no., retention time 1 min, RC • Flocculation basin channels: 233 m³, 9 m × 0.4 m × 1.8 m × 36 no., slow speed stirrer × 2, RC • Sedimentation basin: 600 m³, 10 m × 30 m × 2 m × 2 no., Inclined plate 2 line × 4 sets, RC • Rapid sand filtration: 5 m × 5 m × 4 × 4 no., filtration speed 75 m/day, graded sand • Clear water tank: 2,000 m³, 20 m × 22.5 m × 5m, concrete	

		② Kayahwe WTP	• Type of treatment: Slow sand filtration with coagulation + chlorine disinfection • Current treatment capacity (2022, year): 5,000 m^3/day • Design treatment capacity (Year 1975): 5,000 m^3/day • Year Built: 1975 • Structure of main facility: ◆ Receiving channel: N/A m^3, 15 m × 0.5 m × 1.5 m × 1 no., retention time 1 min, RC ◆ Flocculation basin: 15 m^3, 2.5 m × 3 m × 2 m × 1no., slow speed stirrer × 2, RC ◆ Sedimentation basin: N/A m^3, 7 m × 16 m × 3 m × 2no., RC ◆ Slow sand filtration: 3.5 m × 3.5m × 3 no., filtration speed 40 m/day, graded sand ◆ Clear water tank: 225 m^3, 10m, concrete	
3	Water treatment conditions	① Kiawambeu WTP	• Utilization of plant capacity: 50 % • Hours for WTP Utilization: 24 • Flow diagram of the water treatment process: Raw water → Inlet chamber (Dosing of alum and pre-chlorination) → Flocculation channels → Sedimentation tanks → Sand filters → Filter gallery (Dosing of chlorine) → Clear water storage tank • Type and amount of chemicals used during the process (2022) for during the dry and rainy seasons: ◆ PAC: 200 kg/day ◆ Sodium hypochlorite: 15 kg/day ◆ Concentrated sulfuric acid: N/A ◆ Lime: 100 kg/day • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor cost: N/A	

			◆ Chemical cost: N/A ◆ Electricity cost: N/A ◆ Maintenance cost: N/A ◆ Other cost: N/A	
		② Kayahwe WTP	• Utilization of plant capacity: 100 % • Hours for WTP Utilization: 24 Flow diagram of the water treatment process: Raw water → Inlet chamber (Dosing of alum and pre-chlorination) → Flocculation chambers → Sedimentation tanks → Sand filters (Dosing of chlorine) → Clear water storage tank • Type and amount of chemicals used during the process (2022) for during the dry and rainy seasons: ◆ PAC: 200 kg/day ◆ Sodium hypochlorite: 12 kg/day ◆ Concentrated sulfuric acid: N/A ◆ Lime: 100 kg/day • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor cost: N/A ◆ Chemical cost: N/A ◆ Electricity cost: N/A ◆ Maintenance cost: N/A ◆ Other cost: N/A	
4	Water quality test	① Mukangu WTP	• Main items to be tested in each process and frequency of the test (raw water, after treatment and so on): Refer to Table 1. • Compliance with water quality standards: Refer to Table 1.	

		② Karigiri WTP	• Main items to be tested in each process and frequency of the test (raw water, after treatment and so on): Refer to Table 1. • Compliance with water quality standards: Refer to Table 1.	
5	Future development plan	① Kayahwe WTP	• Treatment capacity: 5,000 ㎥/day (Additional) • Target year: 2030 Purpose: The TW serves the lower parts of Murangá Municipality. The current demand is met by the current supply. However, with the rapid growth in population and urbanization, the demand is expected to overtake supply by 2030 thus the need for expansion of the treatment facilities. The current water sources can accommodate further abstraction of 5,000 m3/day	
		② Mathioya WTP constructed in Murang'a County	• Treatment capacity: 25,000 ㎥/day (New) • Scheduled year: 2024- 2027 • Purpose: Muwasco currently serves 145 km^2 which is expected to expand to 330 km^2 with the revision of municipality boundaries. This will require investment in more water sources and treatment facilities. The project will treat 15,000 m^3/day to cater for the increased demand. The treatment works shall be located at Gikoe Primary school, Mathioya Constituency https://goo.gl/maps/SgRCXqEAkTk1rAjW9	

Attachment-4: Water Transmission Mains to Reservoir

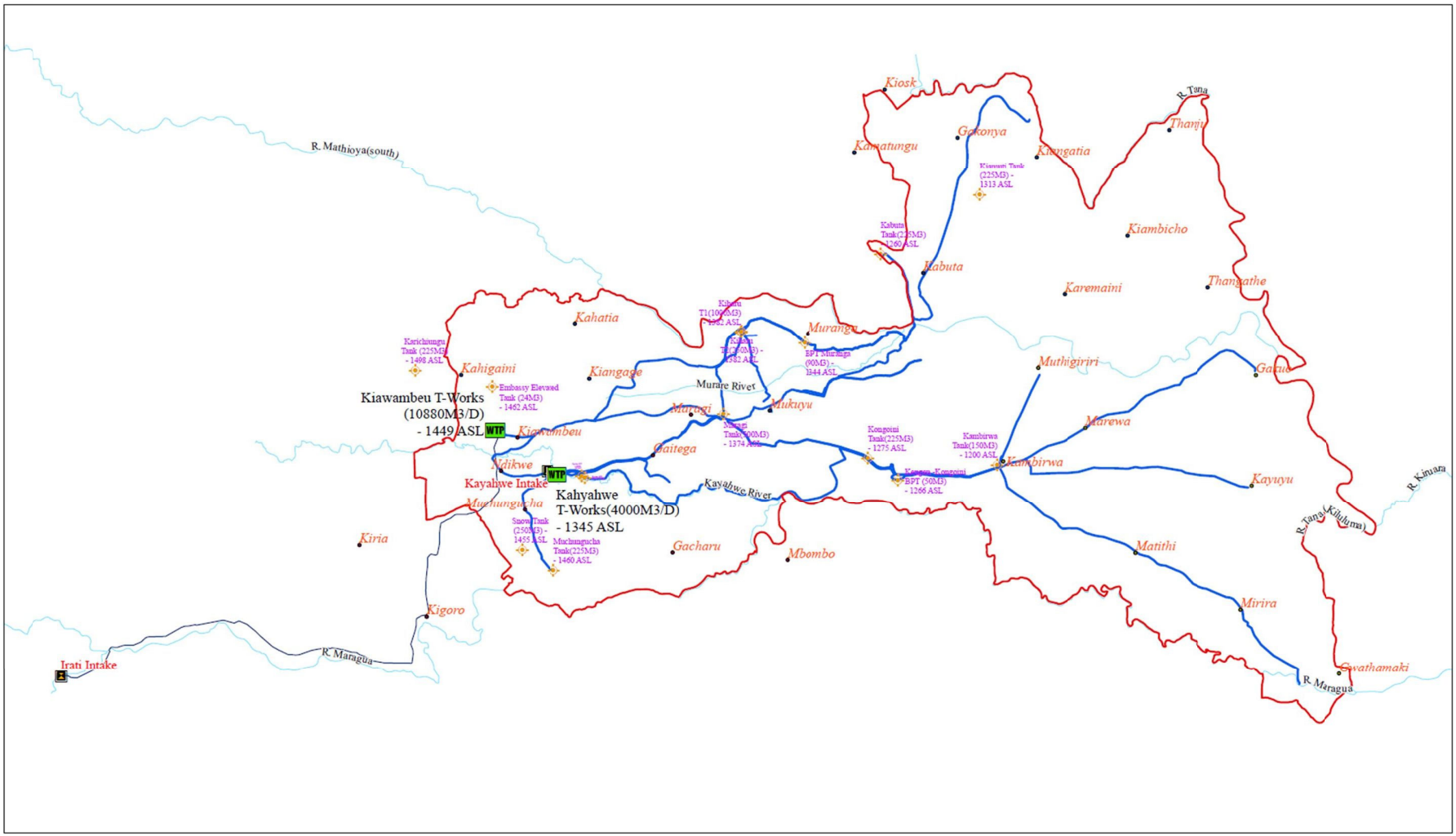
No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of transmission pipeline	① Raw water transmission line (Gravity)		
2	Specifications of Pipeline	N//A	• Location, materials, diameter and length of each pipeline Refer to Table 2 • Year Built: for each pipeline: N/A • NRW of main transmission line: N/A • Transmission pump: N/A	
3	Future development plan	N/A	• Kayahwe – Kiawambeu raw water pipeline (315 mm HDPE) • Length: 9 km • Scheduled year: 2023 • Purpose: The objective of the project is to increase the flow of water into the existing treatment facilities at Kiawambeu. With a capacity of 15,000 m^3/day, the TW only treats approximately 8,000 m^3/day. The gap will be filled by the new sources of water. This will bridge the current supply demand within Murang'a Town. (Currently proposed for financing through AoD – estimated to cost approx. KES 150 million)	
			• Proposed New Murang'a Municipality Water Supply Project (Refer to Table 3)	

Attachment-5: Reservoirs

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of Reservoir	N/A		
2	Specifications of reservoir	N/A	• Current capacity: N/A • Year Built: N/A • Structure of main facility: ◆ Reservoir: N/A ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A	
3	Operation and maintenance and Water quality test	N/A	• Flow diagram of reservoir: N/A • Type and amount of chemicals used before distribution if any: N/A ◆ Sodium hypochlorite: N/A • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor / maintenance cost: N/A ◆ Electricity cost: N/A ◆ Other cost: N/A • Main items to be tested in reservoir: N/A • Compliance with water quality standards: N/A	
4	Future development plan	N/A	N/A	

Attachment-6: Water Distribution Mains

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of distribution pipeline network	Refer to Figure 1.		
2	Specifications of Pipeline	N//A	• Location, materials, diameter and length of each pipeline (Refer to Table 4.) • Year Built: for each pipeline: N/A • Distribution pump: N/A • NRW of main distribution line: N/A	
3	Future development plan	N/A		



Source：MUWASCO

Figure 1 MUWASCO Distribution Main Network

Table 1 Water Quality Test

NAME OF WSP: MURANG'A WATER AND SANITATION COMPANY									
COUNTY: MURANG'A									
MONTHLY WATER QUALITY ASSESSMENT:									
Reporting Month	Jan-22			Feb-22			Mar-22		
System Description:									
Water production to town (m3/month)		273,501		266,185				250,372	
Number of separate networks		2		2				2	
Water provided through network 1(m3/ month)	KIAWAMBEU	182,334		180,457				170,518	
Water provided through network 2(m3/ month)	KAYAHWE	91,167		85,728				79,854	
Please list all the networks		KIAWAMBEU			KIAWAMBEU			KIAWAMBEU	
Report on required and conducted tests:									
Is there a monitoring program in	JANUARY			FEBRUARY			MARCH		
Networks 1									
KIAWAMBEU	Number of tests planned according to guideline	Number of tests conducted	Number of tests within Standard	Number of tests planned according to guideline	Number of tests conducted	Number of tests within Standard	Number of tests planned according to guideline	Number of tests conducted	Number of tests within Standard
Residual chlorine	159	678	678	159	626	626	159	702	702
Bacteriological	67	15	15	67	15	15	67	15	15
Turbidity, pH, colour	40	1650	1650	40	2383	2383	40	2700	2700
Other physio-chemical	40	1650	1650	40	2383	2383	40	2700	2700
KAYAHWE	Number of tests planned according to guideline	Number of tests conducted	Number of tests within Standard	Number of tests planned according to guideline	Number of tests conducted	Number of tests within Standard	Number of tests planned according to guideline	Number of tests conducted	Number of tests within Standard
Residual chlorine	93	182		93	168	168	93	180	180
Bacteriological	35	5		35	5	5	35	5	5
Turbidity, pH, colour	23	180		23	180	180	23	180	180
Other physio-chemical	23	180		23	180	180	23	180	180
Please list all the networks									
Total number of tests in networks	Number of tests required per year	Number of tests conducted -JAN	Number of tests within Standard	Number of tests required per year	Number of tests conducted- FEB	Number of tests within Standard	Number of tests required per year	Number of tests conducted -MARCH	Number of tests within Standard
Residual chlorine	220	860	860	220	794	794	220	882	882
Bacteriological	98	20	20	98	20	20	98	20	20
Turbidity, pH, colour	55	1,832	1,832	55	2,562	2,562	55	2,880	2,880
Other physio-chemical	55	1832	1832	55	2562	2562	55	2880	2880
Treatment Work 1									
Number of tests required per year Number of tests conducted									
Residual chlorine									
Bacteriological									
Turbidity, pH, colour									
Other physio-chemical									
Treatment chemicals for water production									
Quantity Amount Kshs									
Chemical ALUM 19,800 KGS									
Chemical SODA ASH 240 KGS									
Chemical HTH 2,208 KGS									
Please list all chemicals used									
In case of deviation from No. of planned tests give reasons and state what action was taken:									
In case of non-compliance for water quality above acceptable limits of tested samples give reasons and state what action was taken									
Additional comments									

Source：MUWASCO

Table 2 Water Transmission Mains

Water Transmission Mains					
DIAMETER	Steel (Km)	HDPE (Km)	PVC (Km)	TOTAL (Km)	SHARE (%)
DN 400	2.3	-	-	2.3	4.57
DN 350	15.0	-	-	15.0	29.82
DN 300	-	-	12.0	12.0	23.86
DN 280	-	9.0	-	9.0	17.89
DN 250	7.0	-	-	7.0	13.91
DN 200	5.0	-	-	5.0	9.94
Sum	29.3	9.0	12.0	50.3	100%

Source：MUWASCO

Table 3 Water Transmission Mains (Future Development Plan)

Water Transmission Mains					
DIAMETER	Steel (Km)	HDPE (Km)	PVC (Km)	TOTAL (Km)	SHARE (%)
DN 500	12	-	-	12	12%
DN 200	-	29	-	29	30%
DN 250	-	36	-	36	37%
DN 450	-	20	-	20	21%
Sum	12	85	-	97	100%

Source：MUWASCO

Table 4 Water Distribution Mains

Water Distribution Mains					
DIAMETER	Steel (Km)	HDPE (Km)	PVC (Km)	TOTAL (Km)	SHARE (%)
DN 400	2.3	-	-	2.3	4.57
DN 350	15	-	-	15	29.82
DN 300	-	-	12	12	23.86
DN 280	-	9	-	9	17.89
DN 250	7	-	-	7	13.91
DN 200	5	-	-	5	9.94
Sum	29.3	0	12	50.3	100%

Source：MUWASCO

WSP-5

Ruiru-juja WSP (RUJWASCO)

Project for Strengthening Capacity of Water Service Providers on Formulating Bankable Project Plans

Questionnaire (RUJWASCO)

No.	Questions	Answers
1	Are you willing to borrow the money from commercial bank when selected as target WSP?	Yes
2	Kindly specify last 10 years project with major project comportment and amount, and source of fund for each project.	N/A
3	Kindly provide the WSP long term plan with annual budget for O&M and investment for water supply system.	【Strategic Plan 2022-2027】
4	Do you currently offer or intended to be offer any fund from doner, AOB, OBA, KPWF, own fund or any others? If yes, kindly provide the detail.	Githurai Water Supply Project (AWWDA - KFW project) : Expansion of pumping works to 28,000 m^3/day, treatment plant, raw water main, transmission main and distribution network. Project cost: KES 1.6 billion Completion date: October 2022.
5	Kindly provide the documents listed in Attachment 1 to 6 and Data Collection List.	Noted.
6	Kindly fill in the details for the overview of water supply facilities as shown in Attachment 1 to 6.	【Attachment 1 to 6】
7	What is the reason for the inactive connections?	■ No payment ■ No water due to technical problem such as no pressure, blockages and so on □There is any other alternative source. □ Deactivate the account during rainy season □ Any other reason, if any please specify
8	What kind of sensitization for the inactive connections to reconnection have been carried out?	• Homestead visits for installment payment of bills
9	Kindly provide the current total water demand (m^3/day) with calculation method and excel file.	138,579 m^3/day (includes the greater Githurai area)
10	Kindly provide the details for the water demand projection with calculation method and excel file.	2023: 149,195 m^3/day 2024: 160,683 m^3/day 2025: 173,056 m^3/day

No.	Questions	Answers
11	Challenges Faced in the Water Supply Facilities 1) Potential of Water Source	□ Enough to develop the future demand □ Enough for current demand □ Not enough ■ Need additional water sources (Dams and boreholes)
	2) Raw Water Quality	■ Meet the standard for drinking purpose □ Meeting the standard but deteriorating
	3) Intake Facility Intake Volume Facility Condition	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand ■ Good □ Fair □ Deteriorating but can utilize □ Need rehabilitation and augmentation
	4) Raw Water Transmission System Transmission Volume Facility Condition	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand ■ Good □ Fair □ Deteriorating but can utilize □ Need rehabilitation and augmentation
	5) Water Treatment Plant Treatment Volume Facility Condition	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand ■ Good □ Fair □ Deteriorating but can utilize □ Need rehabilitation and augmentation

No.	Questions	Answers
	6) Water Distribution Systems Water Pressure	□ Meeting the standards for water pressure □ Not all area meeting the standards for water pressure ■ Not meeting the standard when high demand □ Not meeting the standard
	7) Household Connection	■ Using the saddle clamp with cock □ Using the saddle clam □ Using the tee
	8) Water Meter	■ Using the piston type □ Using propeller type Reason of selecting above: Affordable
	9) Non-Revenue Water (NRW) Reason and each percentage	■ Old pipe (30%) □ Poor material use □ High pressure ■ Meter inaccuracy (10%) ■ Illegal connection (60%) □ Poor workmanship □ Others
	10) Billing System How do you read the water meter? What kind of software for billing system is using?	□ By manual ■ By smart Phone □ By smart meter □ Enterprise Resource Planning (ERP) □ JICS ■ Other (Utility Master funded by internal revenue in 2018)

Attachment-1: Main Water Source

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of water source and intake facility	① Jacaranda / Ruiru River ② Ruiru Town / Ruiru River ③ Ndarugu River ④ 7 no boreholes (St Kizito, Mwihoko primary, Kiuu police post, Githurai Mixed, St Hellen ACK Langata, Kimbo police post, Mumbi) Refer to Figure 1.		
2	Specifications of water source and intake facility	① Jacaranda / Ruiru River	• Water source capacity: N/A m^3/day • Intake capacity: 541 m^3/hour, 13,000 m^3/day • Year Built: 2013 • Structure of intake facility (Elevation N/A masl): ◆ Intake well: N/A ◆ Grit chamber: N/A ◆ Pump: N/A	
		② Ruiru Town / Ruiru River	• Water source capacity: N/A m^3/day • Intake capacity: 62.5 m^3/hour, 1,500 m^3/day • Year Built: N/A • Structure of intake facility (Elevation N/A masl): ◆ Intake well: N/A ◆ Grit chamber: N/A ◆ Pump: N/A	
		③ Ndarugu River (New WTP)	• Water source capacity: N/A m^3/day • Intake capacity: 208 m^3/hour, 5,000 m^3/day • Year Built: N/A • Structure of intake facility (Elevation N/A masl): ◆ Intake well: N/A ◆ Grit chamber: N/A ◆ Pump: N/A	

		④ Ndarugu River (Old WTP)	• Water source capacity: N/A m^3/day • Intake capacity: 62.5 m^3/hour, 1,500 m^3/day • Year Built: N/A • Structure of intake facility (Elevation N/A masl): ◆ Intake well: N/A ◆ Grit chamber: N/A ◆ Pump: N/A	
		⑤ 7 no boreholes	• Water source capacity: N/A m^3/day • Intake capacity: 83 m^3/hour, 2,000 m^3/day • Year Built: N/A • Structure of intake facility (Elevation N/A masl): ◆ Intake well: N/A ◆ Grit chamber: N/A ◆ Pump: N/A	
3	Outstanding annual and seasonal fluctuation / trend, if any	N/A	• Maximum intake: N/A • Minimum intake: N/A • Permanent river or seasonal river: N/A	
4	Future development plan	N/A		

Attachment-2: Management Structure and Area of Coverage

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location of water supply area / county	① Ruiru town, Gitambaya, Murera, Mugutha, Ruiru East, Thome, Membley ② Thome, Kimbo ③ Juja town, Greefield, Kalimoni, Jujafarm, Highpoint, Ndarugu, Kenyatta Road, Weteithie (Malaba, Kibute, Nyasaba, Muthaara) ④ Gachororo, Greenfield, Mirimaini ⑤ Mwihoko, Kiuu, Kimbo Refer to Figure 1.		
2	General information of water supply area / county	① Ruiru town, Gitambaya, Murera,	• Population / Beneficiaries: N/A • Household connections: 25,520 • Water Kiosk: N/A • Total / coverage area: N/A	

		Mugutha, Ruiru East, Thome, Membley ② Thome, Kimbo	• Average service hours: N/A • Water Treatment Plant: N/A • Main water source: N/A • Current domestic water demand: N/A • Future domestic water demand: N/A	
		③ Juja town, Greefield, Kalimoni, Jujafarm, Highpoint, Ndarugu, Kenyatta Road, Weteithie (Malaba, Kibute, Nyasaba, Muthaara) ④ Gachororo, Greenfield, Mirimaini	• Population / Beneficiaries: N/A • Household connections:10,483 • Water Kiosk: N/A • Total / coverage area: N/A • Average service hours: N/A • Water Treatment Plant: N/A • Main water source: N/A • Current domestic water demand: N/A Future domestic water demand: N/A	
		⑤ Mwihoko, Kiuu, Kimbo	• Population / Beneficiaries: N/A • Household connections: 3,797 • Water Kiosk: N/A • Total / coverage area: N/A • Average service hours: N/A • Water Treatment Plant: N/A • Main water source: N/A • Current domestic water demand: N/A • Future domestic water demand: N/A	

Attachment-3: Water Treatment Plant (WTP)

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of WTP	① Jacaranda WTP ② Juja WTP ③ Juja Composite WTP ④ Ruiru Composite WTP Refer to Figure 1.		
2	Specifications of WTP	① Jacaranda WTP	• Type of treatment: Conventional treatment process with coagulation, flocculation, sedimentation, aeration, rapid sand filtration + disinfection • Current treatment capacity: N/A m^3/day • Design treatment capacity: 13,000 m^3/day • Year Built: 2013 • Structure of main facility: Flocculation units: 10,050 × 10,000 × 2,000 mm Sedimentation tanks: 22,500 × 10,000 × 3,150 mm Filtration units: 52,00 × 4,850 × 4,770 mm Clear water tank: 6,000 m^3, RC masonry	
		② Juja WTP	• Type of treatment: Conventional treatment process with coagulation, flocculation, sedimentation, aeration, rapid sand filtration + disinfection • Current treatment capacity: N/A m^3/day • Design treatment capacity: 6,000 m^3/day • Year Built: 2013 • Structure of main facility: Flocculation units: 6,520 × 4,070 × 1,300 mm Sedimentation tanks: 12,000 × 3,950 × 3,000 mm Filtration units: 2,950 × 3,100 × 3,950 mm Clear water tank: 150 m^3, RC masonry	

		③ Juja Composite WTP	• Type of treatment: Composite filtration treatment • Current treatment capacity: N/A m^3/day • Design treatment capacity: 1,500 m^3/day • Year Built: N/A • Structure of main facility: Clear water tank: 150 m^3, RC masonry	
		④ Ruiru Composite WTP	• Type of treatment: Composite filtration treatment • Current treatment capacity: N/A m3/day • Design treatment capacity: 1,500 m3/day • Year Built: N/A • Structure of main facility: • Clear water tank: 150 m3, RC masonry	
3	Water treatment conditions	① Jacaranda WTP ② Juja WTP ③ Juja Composite WTP ④ Ruiru Composite WTP	• Utilization of plant capacity: N/A % • Hours for WTP Utilization: N/A • Flow diagram of the water treatment process: N/A • Type and amount of chemicals used during the process for during the dry and rainy seasons: ◆ PAC: N/A kg/day ◆ Sodium hypochlorite: N/A kg/day ◆ Concentrated sulfuric acid: N/A kg/day ◆ Lime: N/A kg/day • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor cost: N/A ◆ Chemical cost: N/A ◆ Electricity cost: N/A ◆ Maintenance cost: N/A ◆ Other cost: N/A	

4	Water quality test	① Jacaranda WTP ② Juja WTP ③ Juja Composite WTP ④ Ruiru Composite WTP	• Main items to be tested in each process and frequency of the test (raw water, after treatment and so on): Refer to Table 1. Compliance with water quality standards: Refer to Table 1.	
5	Future development plan	N/A	N/A	

Attachment-4: Water Transmission Mains to Reservoir

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of transmission pipeline	Refer to Figure 1.		
2	Specifications of Pipeline	N/A	• Location, materials, diameter and length of each pipeline: N/A • Year Built: for each pipeline: N/A • NRW of main transmission line: N/A • Transmission pump: N/A	
3	Future development plan	N/A	N/A	

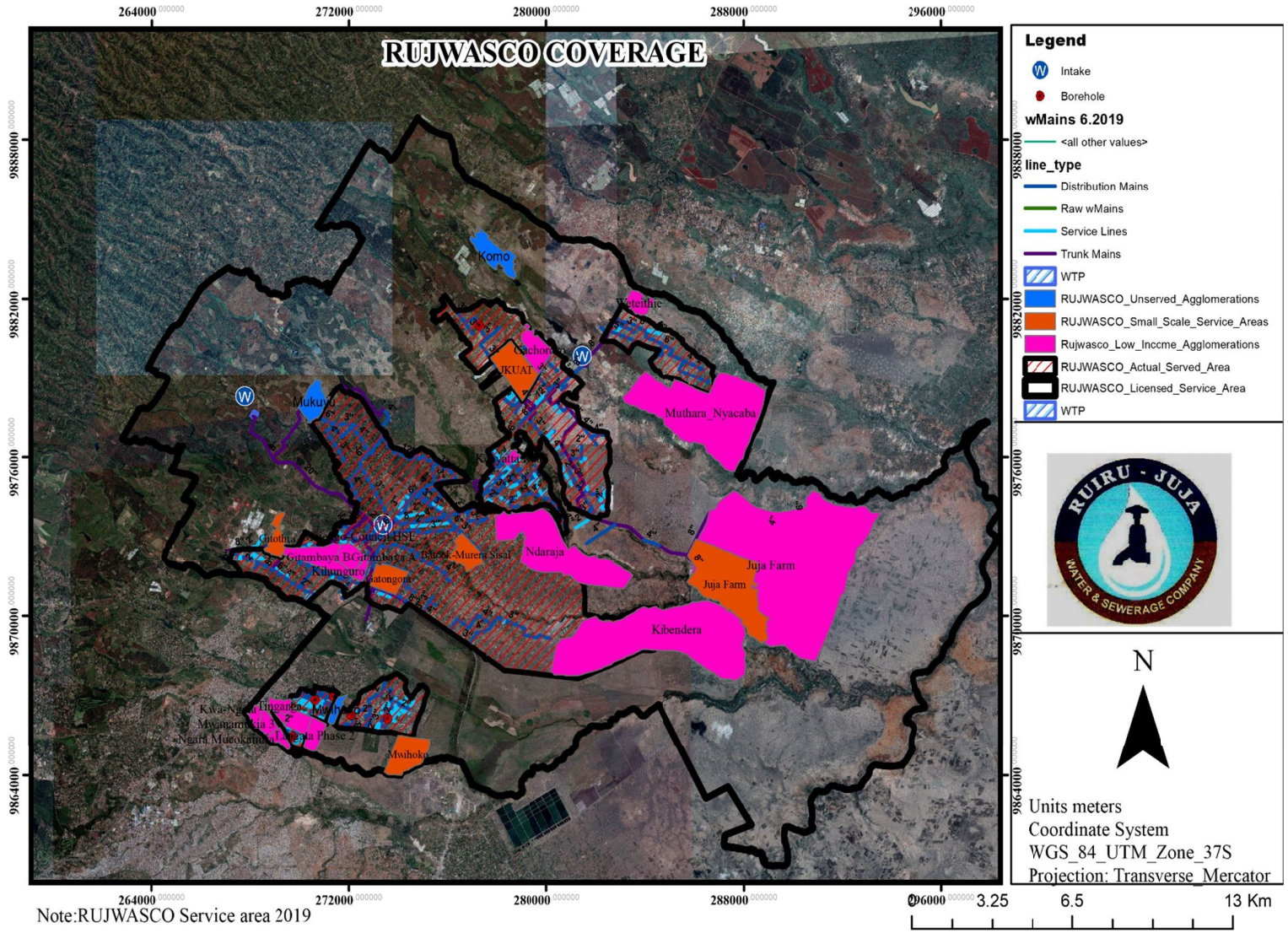
Attachment-5: Reservoirs

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of Reservoir	① Jacaranda WTP clear water tank ② Juja WTP clear water tank ③ Juja Composite WTP clear water tank ④ Ruiru Composite WTP clear water tank		
2	Specifications of reservoir	① Jacaranda WTP clear water tank	• Current capacity: 6,000 m^3 • Year Built: N/A • Structure of main facility: ◆ Reservoir: N/A ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A	
		② Juja WTP clear water tank	• Current capacity: 150 m^3 • Year Built: N/A • Structure of main facility: ◆ Reservoir: N/A ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A	
		③ Juja Composite WTP clear water tank	• Current capacity: 150 m^3 • Year Built: N/A • Structure of main facility: ◆ Reservoir: N/A ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A	
		④ Ruiru Composite WTP clear water tank	• Current capacity: 150 m^3 • Year Built: N/A • Structure of main facility: ◆ Reservoir: N/A ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A	

3	Operation and maintenance and Water quality test	① Jacaranda WTP clear water tank ② Juja WTP clear water tank ③ Juja Composite WTP clear water tank ④ Ruiru Composite WTP clear water tank	• Flow diagram of reservoir: N/A • Type and amount of chemicals used before distribution if any: N/A ◆ Sodium hypochlorite: N/A • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor / maintenance cost: N/A ◆ Electricity cost: N/A ◆ Other cost: N/A • Main items to be tested in reservoir: N/A • Compliance with water quality standards: N/A	
4	Future development plan	N/A	N/A	

Attachment-6: Water Distribution Mains

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of distribution pipeline network	① Ruiru Water Network ② Juja Water Network ③ Githurai Water Network Refer to Figure 1.		
2	Specifications of Pipeline	① Ruiru Water Network	• Location, materials, diameter and length of each pipeline Refer to Table 2. • Year Built: for each pipeline: N/A • Distribution pump: N/A • NRW of main distribution line: N/A	
		② Juja Water Network	• Location, materials, diameter and length of each pipeline • Refer to Table 3. • Year Built: for each pipeline: N/A • Distribution pump: N/A • NRW of main distribution line: N/A	
		③ Githurai Water Network	• Location, materials, diameter and length of each pipeline • Refer to Table 4. • Year Built: for each pipeline: N/A • Distribution pump: N/A • NRW of main distribution line: N/A	
3	Future development plan	N/A	N/A	



出典：RUJWASCO 提供資料

Figure 1 RUJWACO Coverage Area 1

Table 1 Water Quality and Compliance

WTP	TYPE OF WATER	TESTS CONDUCTED	FREQUENCY OF TESTS	COMPLIANCE WITH STANDARDS
Jacaranda w/s	Raw water	pH	2 times/day	100%
		conductivity		100%
		turbidity		0%
		color		0%
	Treated water	pH	5 times/day	100%
		conductivity		100%
		turbidity		96%
		Residual chlorine		100%
		color		95%
Ruiru w/s	Raw water	pH	2 times/day	100%
		conductivity		100%
		turbidity		0%
		color		0%
	Treated water	pH	5 times/day	100%
		conductivity		100%
		turbidity		95%
		Residual chlorine		98%
		color		95%
Juja Old	Raw water	pH	2 times/day	100%
		conductivity		100%
		turbidity		0%
		color		0%
	Treated water	pH	5 times/day	100%
		conductivity		100%
		turbidity		98%
		Residual chlorine		95%
		color		97%
Juja New	Raw water	pH	2 times/day	100%
		conductivity		100%
		turbidity		0%
		color		0%
	Treated water	pH	5 times/day	100%
		conductivity		100%
		turbidity		97%
		Residual chlorine		96%
		color		95%

出典：RUJWASCO 提供資料

Table 2 Ruiru Water Distribution Network

Ruiru Water Network			
wMains			
	Polyvinyl Chloride (PVC)	Cast Iron (CI)	High-Density Polyethylene (HDPE)
Size(Inches)	Length	Length	Length
2.5"	0.0	0.0	3.0
3"	28.2	0.2	33.9
4"	17.5	0.2	45.2
6"	5.0	0.3	21.5
8"	3.8	239.3	29.6
10"	0.0	0.0	4.1
12"	0.0	0.0	0.0
18"	0.0	1.3	0.0
20"	0.0	6.6	0.0
Sum	54.5	247.8	137.3
wService Lines			
	Polyvinyl Chloride (PVC)	Cast Iron (CI)	High-Density Polyethylene (HDPE)
Size(Inches)	Length	Length	Length
0.5"	1.7	0.0	0.0
0.75"	3.5	0.0	0.0
1"	5.8	0.3	36.4
1.25"	0.0	0.0	4.8
1.5"	77.0	0.2	144.9
2"	42.9	0.1	47.0
2.25"	0.0	0.0	3.2
Sum	130.8	0.6	236.3

出典：RUJWASCO 提供資料

Table 3 Juja Water Distribution Network

Juja Water Network			
wMains			
	Polyvinyl Chloride (PVC)	Cast Iron (CI)	High-Density Polyethylene (HDPE)
Size(Inches)	Length	Length	Length
3"	15.7	0.0	35.4
4"	14.3	0.0	23.1
5"	0.6	0.0	0.0
6"	4.5	0.0	20.5
8"	4.5	0.0	34.3
10"	0.0	0.0	0.0
12"	0.0	2.5	0.0
Sum	39.7	2.5	113.2
wService Lines			
	Polyvinyl Chloride (PVC)	Cast Iron (CI)	High-Density Polyethylene (HDPE)
Size(Inches)	Length	Length	Length
0.75"	2.8	0.0	0.2
1"	35.9	0.0	19.7
1.5"	85.6	0.4	70.3
2"	43.3	0.0	36.2
Sum	167.5	0.4	126.4

出典：RUJWASCO 提供資料

Table 4 Githurai Water Distribution Network

Githurai Water Network	
wMains	
	High-Density Polyethylene (HDPE)
Size(Inches)	Length
3"	11.8
4"	2.5
6"	0.4
8"	0.0
10"	0.0
12"	0.0
18"	0.0
20"	0.0
Sum	14.6

出典：RUJWASCO 提供資料

WSP-6

Mavoko WSP (MAVWASCO)

Project for Strengthening Capacity of Water Service Providers on Formulating Bankable Project Plans

Questionnaire (MAVWASCO)

No.	Questions	Answers
1	Are you willing to borrow the money from commercial bank when selected as target WSP?	Yes.
2	Kindly specify last 10 years project with major project comportment and amount, and source of fund for each project.	• WSTF (UPC): KES 100 million (2nd to 5th Call) • Mavoko Water Supply: KES 2.8 billion • Athi River Slums Sewer: KES 100 million • Mombasa Road Relocation: KES 150 million cumulative
3	Kindly provide the WSP long term plan with annual budget for O&M and investment for water supply system.	Noted.
4	Do you currently offer or intended to be offer any fund from doner, AOB, OBA, KPWF, own fund or any others? If yes, kindly provide the detail.	No.
5	Kindly provide the documents listed in Attachment 1 to 6 and Data Collection List.	Noted.
6	Kindly fill in the details for the overview of water supply facilities as shown in Attachment 1 to 6.	【Attachment 1 to 6】
7	What is the reason for the inactive connections?	□ No payment ■ No water due to technical problem such as no pressure, blockages and so on ■ There is any other alternative source. □ Deactivate the account during rainy season □ Any other reason, if any please specify
8	What kind of sensitization for the inactive connections to reconnection have been carried out?	• SMS communication • Notices through public posters
9	Kindly provide the current total water demand (m^3/day) with calculation method and excel file.	Approximately 20,000 m^3/day
10	Kindly provide the details for the water demand projection with calculation method and excel file.	N/A

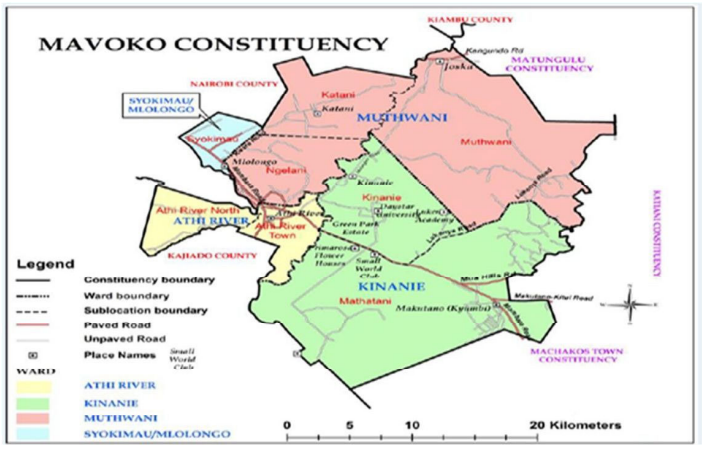
No.	Questions	Answers
11	Challenges Faced in the Water Supply Facilities 1) Potential of Water Source	□ Enough to develop the future demand □ Enough for current demand ■ Not enough ■ Need additional water sources (Stoni Athi, Mbagathi)
	2) Raw Water Quality	□ Meet the standard for drinking purpose ■ Meeting the standard but deteriorating (1,000 – 2,000 NTU for turbidity during rainy season)
	3) Intake Facility Intake Volume Facility Condition	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand (due to seasonal river) □ Good □ Fair □ Deteriorating but can utilize ■ Need rehabilitation and augmentation
	4) Raw Water Transmission System Transmission Volume Facility Condition	 □ Sufficient for future water demand ■ Sufficient for current demand □ Not sufficient for current demand ■ Good □ Fair □ Deteriorating but can utilize □ Need rehabilitation and augmentation
	5) Water Treatment Plant Treatment Volume Facility Condition	 □ Sufficient for future water demand ■ Sufficient for current demand □ Not sufficient for current demand ■ Good (New Mavoko WTP) ■ Fair (Old Mavoko WTP) □ Deteriorating but can utilize □ Need rehabilitation and augmentation

No.	Questions	Answers
	6) Water Distribution Systems Water Pressure	□ Meeting the standards for water pressure ■ Not all area meeting the standards for water pressure □ Not meeting the standard when high demand □ Not meeting the standard
	7) Household Connection	□ Using the saddle clamp with cock ■ Using the saddle clam ■ Using the tee
	8) Water Meter	■ Using the piston type □ Using propeller type Reason of selecting above: N/A
	9) Non-Revenue Water (NRW) Reason and each percentage	■ Old pipe (15%) ■ Poor material use (5%) ■ High pressure (5%) ■ Meter inaccuracy (35%) ■ Illegal connection (15%) ■ Poor workmanship (10%) ■ Others (15%)
	10) Billing System How do you read the water meter? What kind of software for billing system is using?	□ By manual ■ By smart Phone □ By smart meter □ Enterprise Resource Planning (ERP) □ JICS ■ Other: Majics by SULIS

Attachment-1: Main Water Source

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of water source and intake facility	① Kasoito River Intake ② KMC Dam Refer to Figure 1.		
2	Specifications of water source and intake facility	① Athi River	• Water source capacity: N/A m^3/day • Intake capacity: N/A m^3/hour, N/A m^3/day • Year Built: N/A • Structure of intake facility (Elevation N/A masl): ◆ Intake well: N/A ◆ Grit chamber: N/A ◆ Pump: N/A	
		② KMC Dam	• Water source capacity: N/A m^3/day • Intake capacity: N/A m^3/hour, N/A m^3/day • Year Built: N/A • Structure of intake facility (Elevation N/A masl): ◆ Intake well: N/A ◆ Grit chamber: N/A ◆ Pump: N/A	
3	Outstanding annual and seasonal fluctuation / trend, if any	N/A	• Maximum intake: N/A • Minimum intake: N/A • Permanent river or seasonal river: Seasonal River	
4	Future development plan	N/A	N/A	

Attachment-2: Management Structure and Area of Coverage

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location of water supply area / county	① Mavoko Sub-County 		
2	General information of water supply area / county	① Mavoko Sub-County	• Population / Beneficiaries: 350,000/190,000 • Household connections: N/A • Water Kiosk: N/A • Total / coverage area: 835 / 254 km^2 • Average service hours: 12 hours • Water Treatment Plant: N/A • Main water source: N/A • Current domestic water demand: N/A • Future domestic water demand: N/A	

Attachment-3: Water Treatment Plant (WTP)

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of WTP	① New Mavoko WTP ② Old Mavoko WTP Refer to Figure 1.		
2	Specifications of WTP	① New Mavoko WTP	• Type of treatment: Rapid filtration with coagulation + chlorine disinfection • Current treatment capacity (2021): 6,000 m^3/day • Design treatment capacity: 10,000 m^3/day • Year Built: March, 2021 • Structure of main facility: N/A	
		② Old Mavoko WTP	• Type of treatment: Convectional treatment process with Coagulation, flocculation, sedimentation, aeration, rapid sand filtration + disinfection • Current treatment capacity: 28,000 m^3/day • Design treatment capacity : 28,000 m^3/day • Year Built: March, 2012 • Structure of main facility: ◆ Receiving well: 2,000 m^3, 27 m× 7.5 m× 9.8 m × 1, RC	

3	Water treatment conditions	① New Mavoko WTP	• Utilization of plant capacity: 50 % • Hours for WTP Utilization: 24 • Flow diagram of the water treatment process: N/A • Type and amount of chemicals used during the process for during the dry and rainy seasons: ◆ PAC: N/A kg/day ◆ Sodium hypochlorite: N/A kg/day ◆ Concentrated sulfuric acid: N/A kg/day ◆ Lime: N/A kg/day • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor cost: N/A ◆ Chemical cost: N/A ◆ Electricity cost: N/A ◆ Maintenance cost: N/A ◆ Other cost: N/A	
		② Old Mavoko WTP	N/A	
4	Water quality test	① New Mavoko WTP ② Old Mavoko WTP	• Main items to be tested in each process and frequency of the test (raw water, after treatment and so on): N/A • Compliance with water quality standards: N/A	
5	Future development plan	N/A	N/A	

Attachment-4: Water Transmission Mains to Reservoir

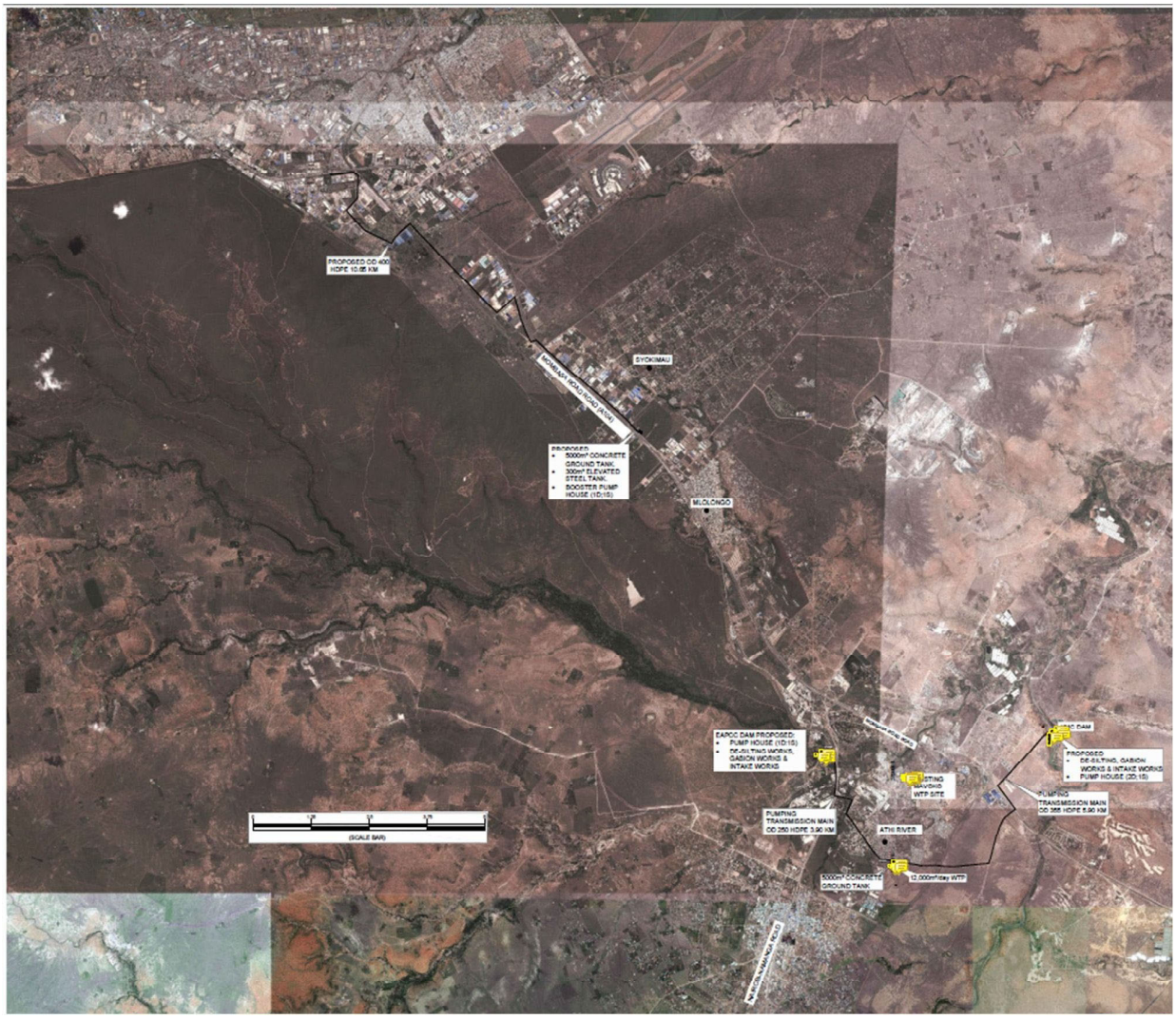
No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of transmission pipeline	① Pumping Transmission Main (HDPE OD 355) ② Pumping Transmission Main (HDPE OD 250) Refer to Figure 1.		
2	Specifications of Pipeline	① Pumping Transmission Main (HDPE OD 355)	• Location, materials, diameter and length of each pipeline: Total length: 5.90 km • Year Built: for each pipeline: N/A • NRW of main transmission line: N/A • Transmission pump: N/A	
		② Pumping Transmission Main (HDPE OD 250)	• Location, materials, diameter and length of each pipeline: Total length: 3.90 km • Year Built: for each pipeline: N/A • NRW of main transmission line: N/A • Transmission pump: N/A	
3	Future development plan	N/A	N/A	

Attachment-5: Reservoirs

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of Reservoir	① Elevated Steel Tank ② Concrete Gound Tank Refer to Figure 1.		
2	Specifications of reservoir	① Elevated Steel Tank	• Current capacity: N/A • Year Built: N/A • Structure of main facility: ◆ Reservoir: N/A ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A	
		② Concrete Gound Tank	• Current capacity: 5,000 m^3 • Year Built: N/A • Structure of main facility: ◆ Reservoir: N/A ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A	
3	Operation and maintenance and Water quality test	① Elevated Steel Tank ② Concrete Gound Tank	• Flow diagram of reservoir: N/A • Type and amount of chemicals used before distribution if any: N/A ◆ Sodium hypochlorite: N/A • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor / maintenance cost: N/A ◆ Electricity cost: N/A ◆ Other cost: N/A • Main items to be tested in reservoir: N/A • Compliance with water quality standards: N/A	
4	Future development plan	N/A	N/A	

Attachment-6: Water Distribution Mains

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of distribution pipeline network	N/A		
2	Specifications of Pipeline	N/A	• Location, materials, diameter and length of each pipeline: N/A • Year Built: for each pipeline: N/A • Distribution pump: N/A • NRW of main distribution line: N/A	
3	Future development plan	N/A	N/A	



Source：MAVWASCO

Figure 1 Mavoko Water Supply Improvement Proposed Measures

WSP-7

Nakuru WSP (NAWASSCO)

Project for Strengthening Capacity of Water Service Providers on Formulating Bankable Project Plans

Questionnaire (NAWASSCO)

No.	Questions	Answers
1	Are you willing to borrow the money from commercial bank when selected as target WSP?	Yes.
2	Kindly specify last 10 years project with major project comportment and amount, and source of fund for each project.	N/A
3	Kindly provide the WSP long term plan with annual budget for O&M and investment for water supply system.	Noted.
4	Do you currently offer or intended to be offer any fund from doner, AOB, OBA, KPWF, own fund or any others? If yes, kindly provide the detail.	Yes.
5	Kindly provide the documents listed in Attachment 1 to 6 and Data Collection List.	Noted.
6	Kindly fill in the details for the overview of water supply facilities as shown in Attachment 1 to 6.	【Attachment 1to 6】
7	What is the reason for the inactive connections?	■ No payment ■ No water due to technical problem such as no pressure, blockages and so on (shortage of water) ■ There is any other alternative source. (Itare Dam Project by WWDA, dam (100,000 m^3/day but to Nakuru 85,000 m^3/day) collect water from river) ■ Deactivate the account during rainy season (However, not common in urban areas) □ Any other reason, if any please specify
8	What kind of sensitization for the inactive connections to reconnection have been carried out?	• Advertise through social media for reconnections. • Arrangement for payment. • Clinics open meetings. • Survey carried out to understand the source of water, reasons for inactive connections.

No.	Questions	Answers
9	Kindly provide the current total water demand (m^3/day) with calculation method and excel file.	70,000 m^3/day.
10	Kindly provide the details for the water demand projection with calculation method and excel file.	N/A
11	Challenges Faced in the Water Supply Facilities 1) Potential of Water Source	□ Enough to develop the future demand □ Enough for current demand ■ Not enough (12 boreholes being drilled able to increase the water production by 20,000 m^3/day to 60,000 m^3/day.) ■ Need additional water sources (Current available boreholes: 29, additional 11 will be drilled to make a total of 40 in two months, another 20 boreholes are planned to be drilled.)
	2) Raw Water Quality	■ Meet the standard for drinking purpose (Flouride (4 - 8 QPM) blend with river water to lower floride level to 2) □ Meeting the standard but deteriorating
	3) Intake Facility Intake Volume	□ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand (Water service coverage: 93%, Increase the capacity of Mereroni Intake to 8,000 m^3/day)
	Facility Condition	□ Good □ Fair ■ Deteriorating but can utilize □ Need rehabilitation and augmentation

No.	Questions	Answers
	4) Raw Water Transmission System Transmission Volume	■ Sufficient for future water demand (AC Pipe: 50 – 100 years, GI and PVC, HDPE being laid lately) □ Sufficient for current demand □ Not sufficient for current demand
	Facility Condition	□ Good □ Fair ■ Deteriorating but can utilize □ Need rehabilitation and augmentation
	5) Water Treatment Plant Treatment Volume	□ Sufficient for future water demand ■ Sufficient for current demand (if fully utilized) □ Not sufficient for current demand
	Facility Condition	□ Good □ Fair ■ Deteriorating but can utilize □ Need rehabilitation and augmentation
	6) Water Distribution Systems Water Pressure	■ Meeting the standards for water pressure (Water pressure (10 m) in CBD is met) ■ Not all area meeting the standards for water pressure (Rationing (Tuesday and Thursday) done to other areas. Pressure cannot build to 10 m. Rationing program shared with all Nakuru residents.) □ Not meeting the standard when high demand □ Not meeting the standard
	7) Household Connection	■ Using the saddle clamp with cock □ Using the saddle clam □ Using the tee
	8) Water Meter	■ Using the piston type (For small water meter) ■ Using propeller type (For big water meter) Reason of selecting above:

No.	Questions	Answers
	9) Non-Revenue Water (NRW) Reason and each percentage	Current NRW: 31% ■ Old pipe □ Poor material use □ High pressure □ Meter inaccuracy ■ Illegal connection □ Poor workmanship □ Others
	10) Billing System How do you read the water meter? What kind of software for billing system is using?	■ By manual (Photo of water meter read will be posted on the software installed in the smart phone) □ By smart Phone □ By smart meter ■ Enterprise Resource Panning (ERP) □ JICS □ Other

Attachment-1: Main Water Source

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of water source and intake facility	① Surface sources: Mireroni and Malewa River Intakes ② Ground sources: boreholes from 4 well-fields that had a total of 25 boreholes. ○ 15 newly drilled boreholes to be commissioned soon. ○ This will bring the total to 40 boreholes. Possible additions of more boreholes from the KFW project. Refer to Figure 1		
2	Specifications of water source and intake facility	① Surface sources	• Water source capacity: N/A m^3/day • Intake capacity: N/A m^3/hour, N/A m^3/day • Year Built: N/A • Strcuture of intake facility (Elevation N/A masl): ◆ Intake well: N/A ◆ Grit chamber: N/A ◆ Pump: N/A	
		② Ground sources	Refer to Table 1.	
3	Outstanding annual and seasonal fluctuation / trend, if any	N/A	• Maximum intake: N/A • Minimum intake: N/A • Permanent river or seasonal river: N/A	
4	Future development plan	① Mireroni river intake revision (Project under KFW)	• Intake capacity: capacity still under review under the KFW project • Scheduled year: Scheduled to commence by June 2022 Purpose: To boost the water supply within the service area	
		② Additional 20 boreholes (Project under KFW)	• Feasibility study in the identified sites undergoing to establish the expected yield. • Scheduled year: Scheduled to commence by June 2022 Purpose: To increase coverage of the drinking water to underserved and un-served areas.	

Attachment-2: Management Structure and Area of Coverage

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location of water supply area / county	100% of Nakuru East and Nakuru West Sub-Counties and part of sublocations along the Solai corridor in Bahati Subcounty The area is divided into five administrative zones: Central zone, Northern zone, Southern zone, Eastern zone and Western zone. Refer to Source：NAWASSCO Figure 2.		
2	General information of water supply area / county	NAWASSSCO Service Area	• Population / Beneficiaries (2019): 533,800 • Household connections (2022): 52,600 • Water Kiosk: 72 • Total / coverage area: (2022): 320 km^2 • Average service hours (2020): 19 hours • Water Treatment Plant: 4 WTP • Main water source: Surface and ground water • Current domestic water demand (year 2022): 80,000 m^3/day • Future domestic water demand (year 2050): 190,000 m^3/day Refer to	

Attachment-3: Water Treatment Plant (WTP)

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of WTP	① Mireroni Treatment Works (Surface and ground water) ② Malewa Treatment Works (Surface water) ③ Olbanita Treatment Works (Ground water) ④ Nairobi Road Treatment Works (Ground water) Refer to Source：NAWASSCO Figure 4.		
2	Specifications of WTP	① Mireroni Treatment Works	• Type of treatment: Full water treatment during rainy season and Chlorination for ground water. • Current treatment capacity (during rainy seasons): 4,500 m^3/day • Design treatment capacity : 6,000 m^3/day • Year Built: 1913 • Structure of main facility: N/A Refer to Source：NAWASSCO Figure 5 and Table 2.	
		② Malewa Treatment Works	• Type of treatment: Rapid filtration with coagulation + chlorine disinfection • Current treatment capacity: 2,200 m^3/day • Design treatment capacity: 2,500 m^3/day • Year Built: 1952 • Clear water tank Capacity: 1,000 m^3, concrete tank Refer to Source：NAWASSCO Figure 6.	
		③ Olbanita Treatment Works ④ Nairobi Road Treatment Works	• Type of treatment: N/A • Current treatment capacity: N/A • Design treatment capacity: N/A • Year Built: N/A • Clear water tank Capacity: N/A The water quality of the groundwater is compatible with the KAS: EAS 12:2018 and thus, do not require any treatment except for preventive disinfection using chlorine lime. Refer to Source：NAWASSCO Figure 7.	

3	Water treatment conditions	① Mireroni Treatment Works	• Utilization of plant capacity: N/A • Hours for WTP Utilization: N/A • Flow diagram of the water treatment process: N/A • Type and amount of chemicals used during the process (2020) for during the dry and rainy seasons: ◆ Sodium hypochlorite: 12,000 kg/yr ◆ Alum: 18,000kg/yr ◆ Soda ash: 3,600 kg/yr • Annual Operation and maintenance cost and its breakdown: 20.8 Mil Ksh/year (estimate cost) ◆ Labor cost: 5.4 Mil Ksh/year (estimate) ◆ Chemical cost: 10.3 Mil Ksh/year ◆ Electricity cost: 4.8 Mil Ksh/year ◆ Maintenance cost: 0.2 Mil Ksh/year ◆ Other cost: 0.1 Mil Ksh/year	
		② Malewa Treatment Works	• Utilization of plant capacity: N/A • Hours for WTP Utilization: N/A • Flow diagram of the water treatment process: N/A • Type and amount of chemicals used during the process (2020) for during the dry and rainy seasons: ◆ Sodium hypochlorite: 1,200 kg/yr ◆ Alum: 6,000kg/yr ◆ Soda ash: 600 kg/yr • Annual Operation and maintenance cost and its breakdown: 5.3 Mil Ksh/year (estimate cost) ◆ Labor cost: 2.9 Mil Ksh/year (estimate) ◆ Chemical cost: 2.1 Mil Ksh/year ◆ Electricity cost: 0.1 Mil Ksh/year ◆ Maintenance cost: 0.1 Mil Ksh/year Other cost: 0.1 Mil Ksh/year	

		③ Olbanita Treatment Works	• Utilization of plant capacity: N/A • Hours for WTP Utilization: N/A • Flow diagram of the water treatment process: N/A • Type and amount of chemicals used during the process (2020) for during the dry and rainy seasons: ◆ Sodium hypochlorite: 5,520 kg/day • Annual Operation and maintenance cost and its breakdown: 58.5 Mil Ksh/year (estimate cost) ◆ Labor cost: 2 Mil Ksh/year (estimate) ◆ Chemical cost: 2.5 Mil Ksh/year ◆ Electricity cost: 48 Mil Ksh/year ◆ Maintenance cost: 5 Mil Ksh/year Other cost: 1 Mil Ksh/year	
		④ Nairobi Road Treatment Works	• Utilization of plant capacity: N/A • Hours for WTP Utilization: N/A • Flow diagram of the water treatment process: N/A • Type and amount of chemicals used during the process (2020) for during the dry and rainy seasons: ◆ Sodium hypochlorite: 6,000 kg/yr • Annual Operation and maintenance cost and its breakdown: 7.4 Mil Ksh/year (estimate cost) ◆ Labor cost: 3.4 Mil Ksh/year (estimate) ◆ Chemical cost: 2.7 Mil Ksh/year ◆ Electricity cost: 0.2 Mil Ksh/year ◆ Maintenance cost: 1 Mil Ksh/year Other cost: 0.1 Mil Ksh/year	

4	Water quality test	① Mireroni Treatment Works ② Malewa Treatment Works ③ Olbanita Treatment Works ④ Nairobi Road Treatment Works	• Main items to be tested in each process and frequency of the test (raw water, after treatment and so on): pH, turbidty in raw water and residue chlorine after treatment which are done 3 times per day • Compliance with water quality standards: 【Lab Data Analysis Report】 N/A	
5	Future development plan	① Construction of dosing towers at Olbanita-bahati reservoir, Eastern reservoir and western reservoir	• Purpose: To accommodate the additional volume from the boreholes • Target year: 2022-2023	
		② Ndundori Mireroni new water treatment plant (refer to map in attachment 1)	• Feasibility study in progress • Scheduled year: to commence in June 2022 • Purpose: To accommodate the extra volume from the revised intake and ensure clean, safe and portable water to those who were getting raw water along the way before reaching the treatment plant at Milimani.	

Attachment-4: Water Transmission Mains to Reservoir

No.	Items	Details / Numbers / Specifications / Conditions	Note
1	Name and location map of transmission pipeline	Refer to Source：NAWASSCO Figure 8. ① Nairobi road reservoir-: • Baharini BH- reservoir: 350mm, GI, rehabilitated in 2008 • Nairobi Road BH – reservoir: 200 mm, AC, 19 • Mireroni TW- reservoir: 350 mm GI ② Western tank: • Malewa TW – reservoir: 350 mm, GI ③ Eastern tank: • Kabatini BH-reservoir: DN 200, HDPE • Gilgil-Reservoir: DN 350, GI - 1952 ④ High rise bahati tank: • Olbanita TW -reservoir: DN 400, GI ⑤ Prison road reservoir: • Mireroni TW - reservoir: DN 300, GI • Gilgil-Reservoir: 350 mm, AC ⑥ Milimani high rise reservoir: • Mireroni TW -reservoir: ⑦ Mireroni TW reservoir: • Kabatini BH-reservoir: DN 400, GI • Bahati high rise reservoir – reservoir: DN 400, GI • Mireroni Intake-reservoir: DN 350, GI • Nairobi Road reservoir- reservoir (not functional): DN 200, GI ⑧ Malewa reservoir: • Malewa intake-reservoir: DN 200, AC	

<table>
<tr>
<td>2</td>
<td>Specifications of Pipeline</td>
<td>① Nairobi road reservoir
② Western tank
③ Eastern tank
④ High rise bahati tank
⑤ Prison road reservoir
⑥ Milimani high rise reservoir
⑦ Mireroni TW reservoir
⑧ Malewa reservoir</td>
<td>• Location, materials, diameter and length of each pipeline
<table>
<tr><th>Distribution Network Characterization</th><th>NAWASSCO</th></tr>
<tr><td>Material of pipes</td><td>GI,HDPE, PVC,AC</td></tr>
<tr><td>Diameters</td><td>DN 25, DN 32, DN 40, DN 50, DN 63, DN 75,DN 90, DN 100, DN 110, DN 150, DN 160, DN 200, DN 225, DN 250, DN 300, DN 350,DN 400, DN 500, DN 600</td></tr>
<tr><td>Total lengths</td><td>841045.18 m</td></tr>
<tr><td>Years of construction</td><td>1940-2020</td></tr>
<tr><td>Temperature of water in the system</td><td>37^{0}C</td></tr>
<tr><td>Number of Tanks</td><td>7</td></tr>
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• Year Built: for each pipeline: N/A
• NRW of main transmission line: N/A
• Transmission pump: N/A</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Future development plan</td>
<td>① Trunk main from Ndundori proposed BHs to Nairobi Road reservoir</td>
<td>Feasibility still underway on several routes to accommodate the additional boreholes around Ndundori area (specific details to be availed soon by the consultants)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>② Rerouting of raw water main from Ndundori intake to Nairobi Road reservoir.</td>
<td>N/A</td>
<td></td>
</tr>
</table>

		③ Construction of 16" rising main from Kabatini – Mireroni TW	• Length: Approximately 6.5 km • Diameter: DN 400 • Material: GI	
		④ Raising main from Baharini BH to Nairobi Road reservoir	• Length: Approximately 6.2 km • Diameter: DN 350 • Material: GI	

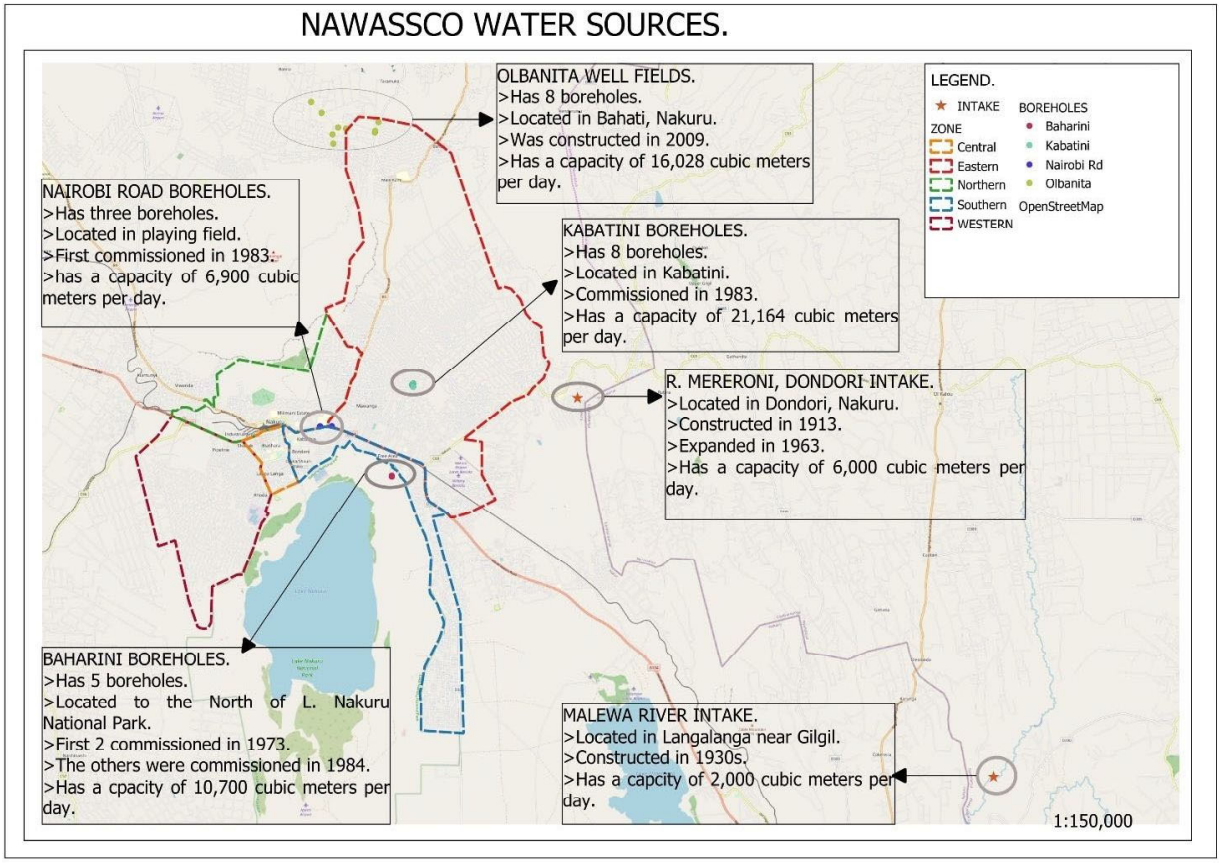
Attachment-5: Reservoirs

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of Reservoir	① Eastern Reservoir ② Western Reservoir ③ Prison Road Reservoir ④ Bahati Reservoir ⑤ Nairobi road Reservoir ⑥ Mereroni Reservoir ⑦ Milimani High Level Reservoir ⑧ Malewa Reservoir Refer to Table 3.		
2	Specifications of reservoir	① Eastern Reservoir ② Western Reservoir ③ Prison Road Reservoir ④ Bahati Reservoir ⑤ Nairobi road Reservoir ⑥ Mereroni Reservoir ⑦ Milimani High Level Reservoir ⑧ Malewa Reservoir	Refer to Table 3.	

3	Operation and maintenance and Water quality test	① Eastern Reservoir ② Western Reservoir ③ Prison Road Reservoir ④ Bahati Reservoir ⑤ Nairobi road Reservoir ⑥ Mereroni Reservoir ⑦ Milimani High Level Reservoir ⑧ Malewa Reservoir	• Flow diagram of reservoir: N/A • Type and amount of chemicals used before distribution if any: N/A ◆ Sodium hypochlorite: N/A • Annual Operation and maintenance cost and its breakdown: KES 0.4 million (Cleaning of the tanks for twice a year, Servicing and replacement of valves) ◆ Labor / maintenance cost: N/A ◆ Electricity cost: N/A ◆ Other cost: N/A • Main items to be tested in reservoir: N/A • Compliance with water quality standards: N/A	
4	Future development plan	① Construction of a 200 m^3 tank at Heshima area	◆ Design capacity 200 m^3 ◆ Material: Concrete ◆ Scheduled year: June 2022 ◆ Purpose: To serve the unserved and underserved residents of Heshima village who are situated on the higher areas of the Solai corridor.	
		② Recommend a tank at hyrax hill	◆ Capacity 4,000 m^3 ◆ Material: Concrete ◆ Scheduled year: N/A ◆ Purpose: To maintain a constant pumping head for the pump that will ensure continuous and reliable water supply to residents of eastern zone and parts of Southern zone.	

Attachment-6: Water Distribution Mains

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of distribution pipeline network	The service area is divided into five main DMAs that serve as the administrative boundaries. i.e., Northern zone, southern zone, eastern zone, western zone and central zone. Refer to Source：NAWASSCO Figure 9.		
2	Specifications of Pipeline	① All service areas	• Location, materials, diameter and length of each pipeline Refer to Table 4 • Year Built: for each pipeline: N/A • Distribution pump: N/A • NRW of main distribution line: N/A	
3	Future development plan	① Replacement of AC lines and old and dilapidated pipelines in southern zone	• Assorted pipe sizes • Scheduled year: 2022-2023	



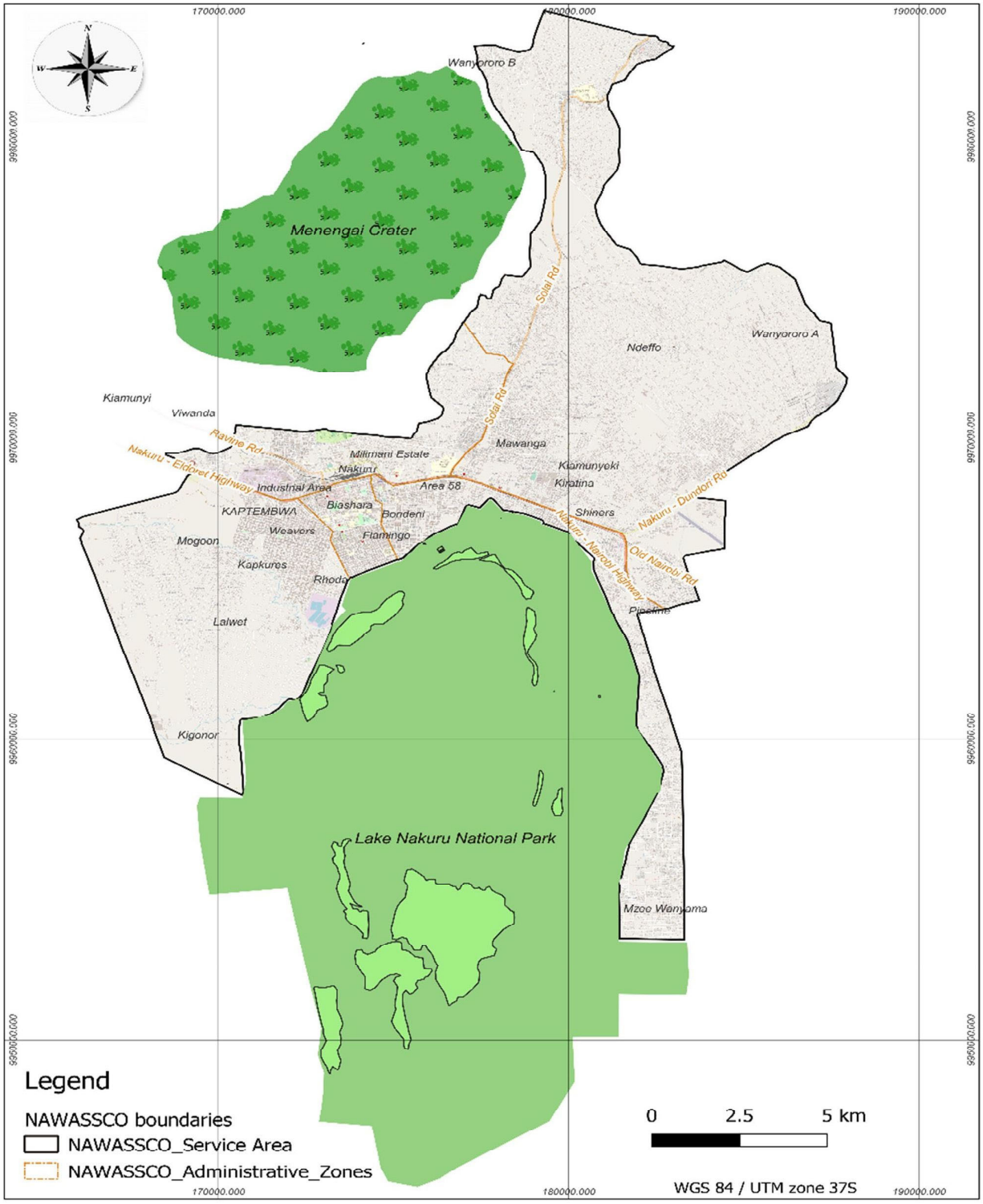
Source：NAWASSCO

Figure 1 NAWASSCO Water Source

Table 1 Profile of Well Fields

Well No	Station	Borehole No.	Casing Dia	G.I drop Pipe Dia	Borehole depth	Discharge	Total head	Static Water Level	Dynamic Water Level
			inch	inch	(m)	m^3/hr		(m)	(m)
1.	KABATINI WELFIELD	1	10”	6”	150	133	130	39.90	45
		2	10”	6”	149	145	130	40.50	50.60
		3	10”	6”	62.5	148	130	37.00	43.52
		4	10”	6”	150	146	130	36.81	43.62
		5	8”	4”	150	80	130	41.4	50.70
		6	10”	6”	150	108	130	41.90	41.54
		7	10”	6”	150	108	130	41.85	45.04
		8	10”	6”	150	133	130	38.50	55.43
2.	BAHARINI WELFIELD	1	10”	4”	71	54	127	54.18	57.48
		2	8”	4”	90	67	127	51.58	53.21
		3	10”	4”	80	67	127	54.18	54.15
		4	10”	6”	100	150	127	52.59	55.59
		5	10”	6”	73	96	127	53.23	55.05
3.	NAIROBI ROAD WELFIELD	4	8”	4”	120	96	120	84.32	85.18
		5	8”	4”	130	60	120	83.60	86.19
		6	8”	4”	120	80	120	84.90	85.23
4.	OLBANITA WELFIELD	1	10”	5”	300	96	184	137.20	182.28
		2	10”	5”	300	76.3	165	159	198.94
		3	10”	5”	300	95.6	178	156.80	199.46
		4	10”	5”	300	84.9	176	166.23	190.0
		5	10”	5”	300	110	174	158.93	166.0
		6	10”	5”	300	125.6	238	152.00	166.93
		7	10”	5”	251	57.7	172	145.64	184.72
		7A	10”	3”	257	14.1	184	145.4	-

Source：NAWASSCO



Source：NAWASSCO

Figure 2 NAWASSCO Service Area

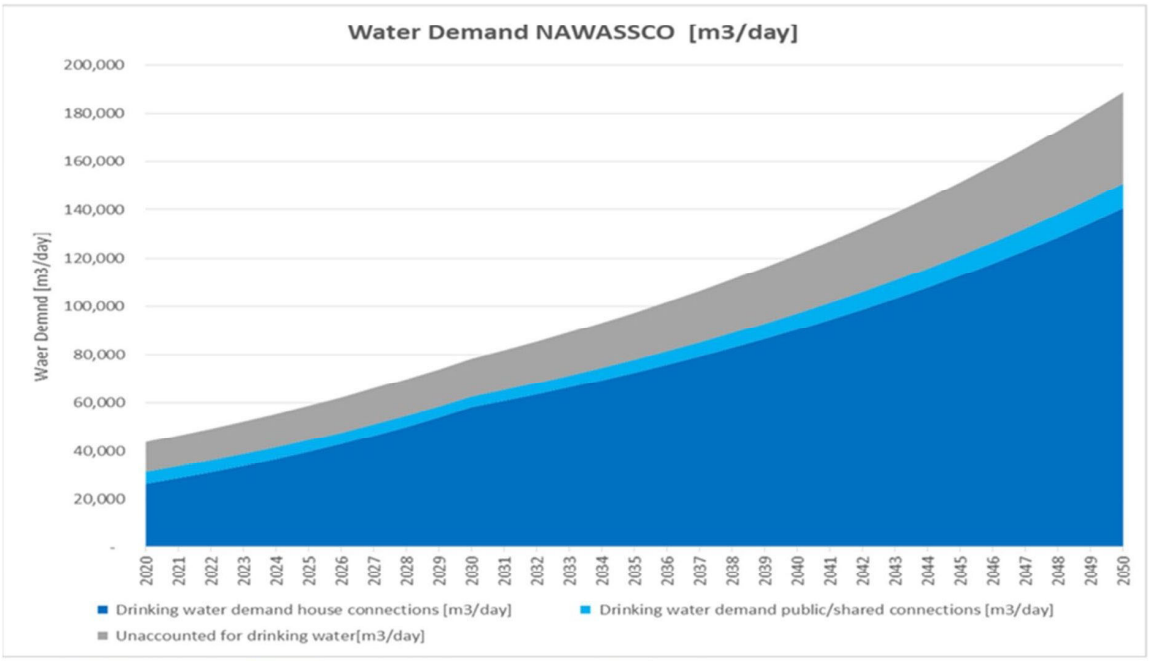
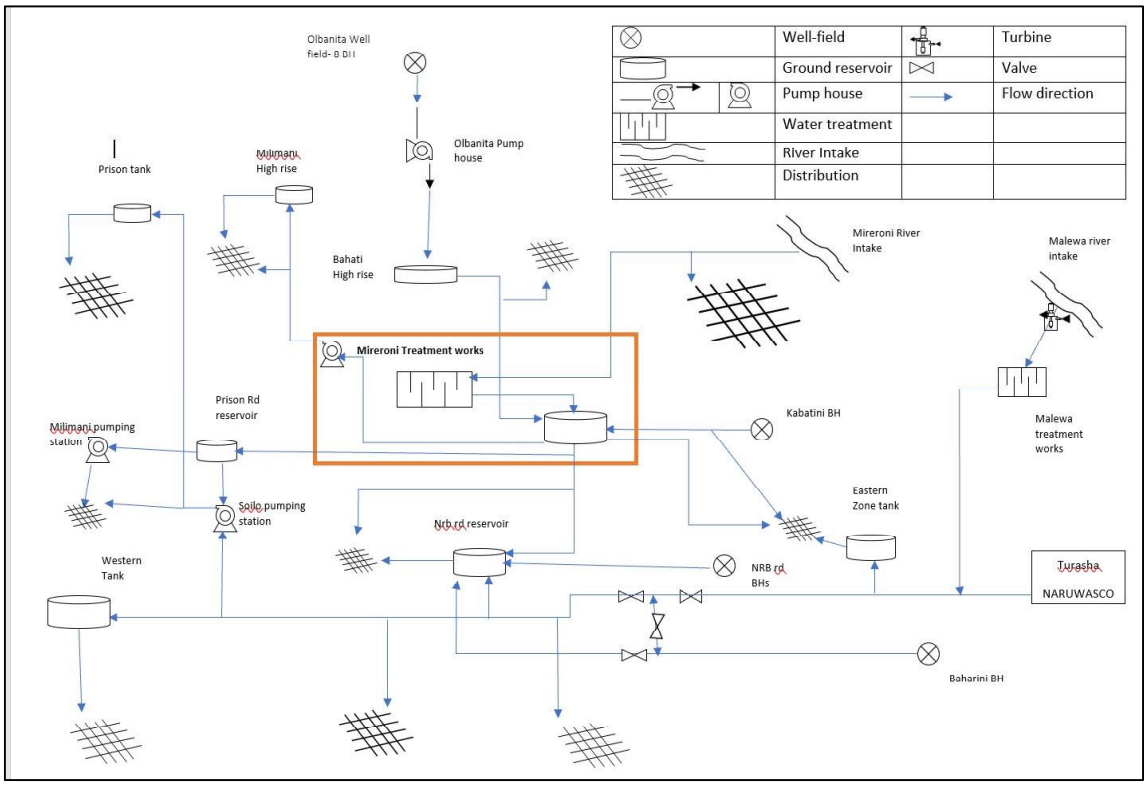


Figure 17 NAWASSCO's Water Demand up to 2050, including water supply from Itare Dam

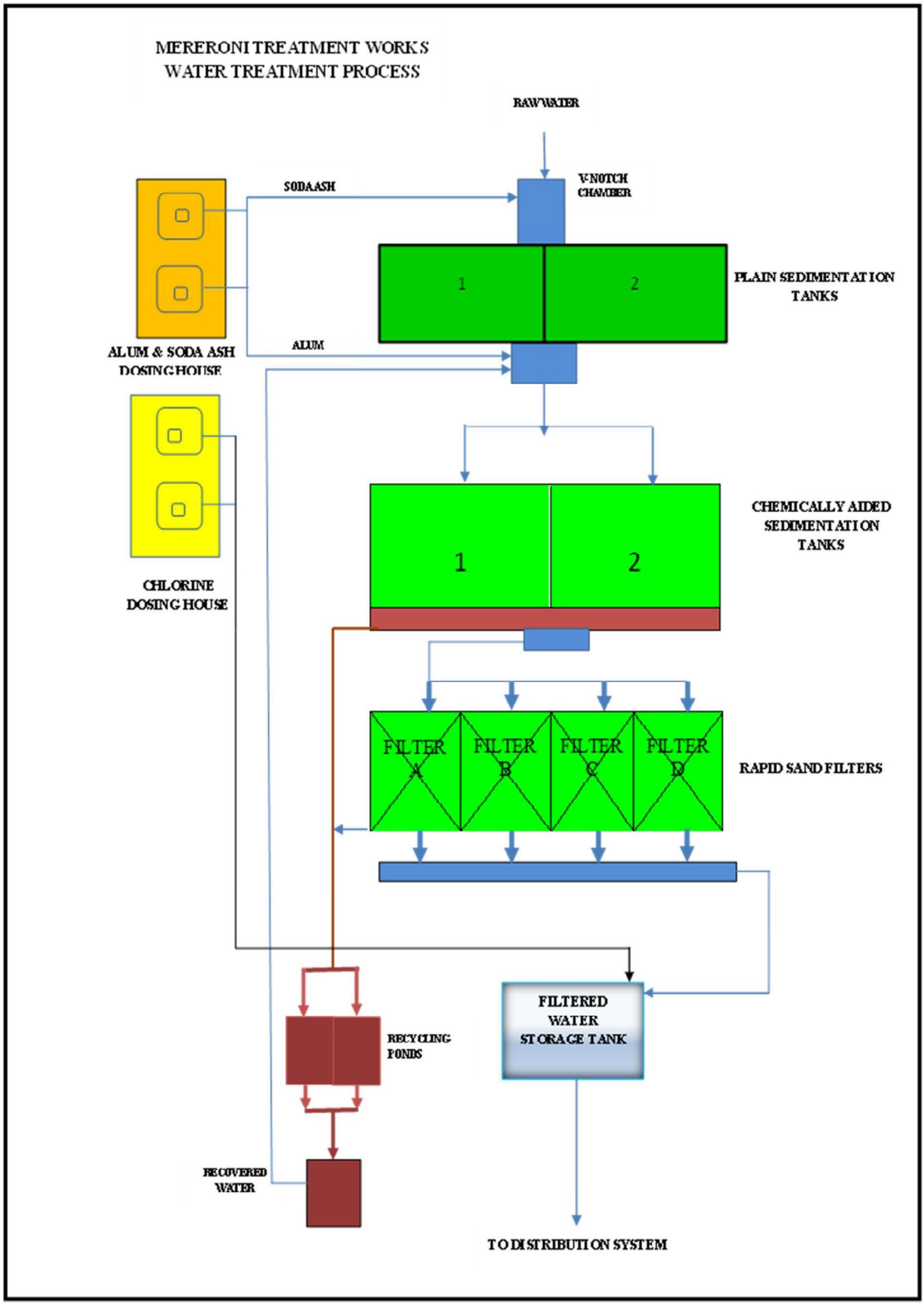
Source：NAWASSCO

Figure 3 NAWASSCO Water Demand Projection



Source：NAWASSCO

Figure 4 NAWASSCO Treatment Works



Source：NAWASSCO

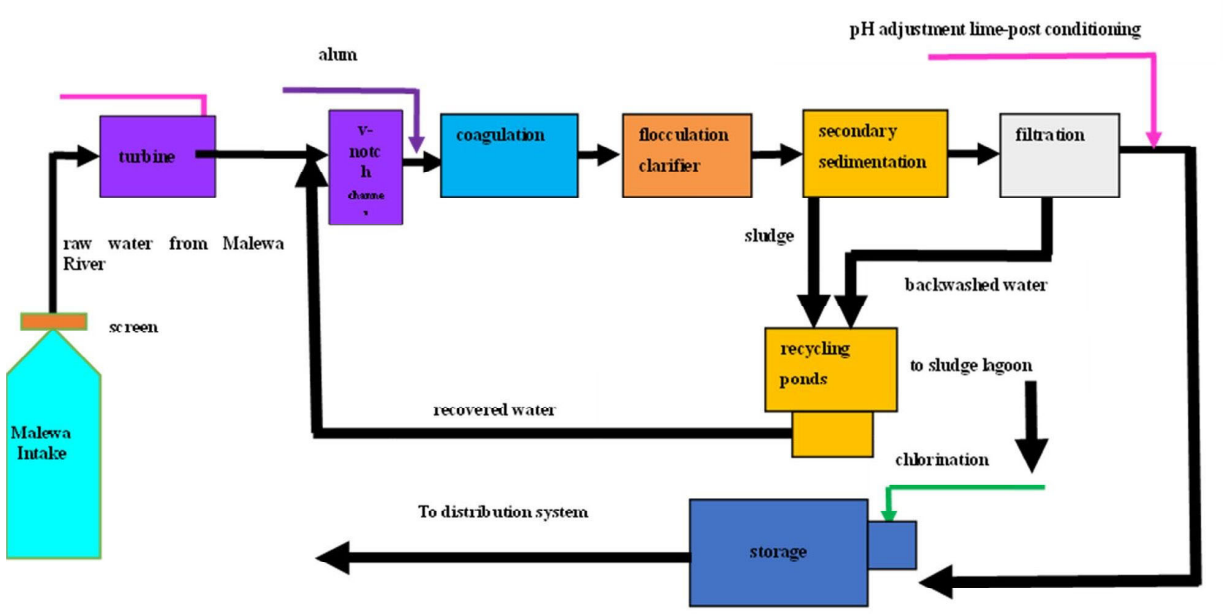
Figure 5 Mereroni Treatment Works

Table 2 Mereroni Treatment Works

Parameter	Units
Receiving chamber	
Retention time	Approximately 1.5min.
Weir	
Plain sedimentation basin	
Type	Hydraulic, Horizontal flow type
Surface loading rate	$1m^3/m^2/hr$
Desilting method	Manual
Rapid Mixing Chamber	
Type	Power driven agitator pump.
Mixing Head	about 2.6m
Chemically aided sedimentation basin	
Type	Conventional, Vertical flow type
Surface loading rate	$1m^3/m^2/hr$
Desludging method	Manual/hydraulic
Filters	
Type	Conventional, constant flow rate, with back washing and surface washing
Filtration rate	$5m^3/m^2/hr$
Backwash rate	$30\text{-}35m^3/m^2/hr$
Surface wash rate	$9m^3/m^2/hr$ backwash and surface wash
Time	8 min.
Clear water reservoir	
Retention Time	1 hr
Chemical dosing facility	
Aluminum sulfate	
Form	Lump
Stock volume	60 day's quantity
Dosing method	Gravity
Dosing rate, max.	Max: 90mg/L
	Avg: 50 mg/L
	Min: 20mg/L
Soda ash	
Form	Lump
Stock volume	60 day's quantity
Dosing method	Gravity
Dosing rate, max.	Max: 100mg/L

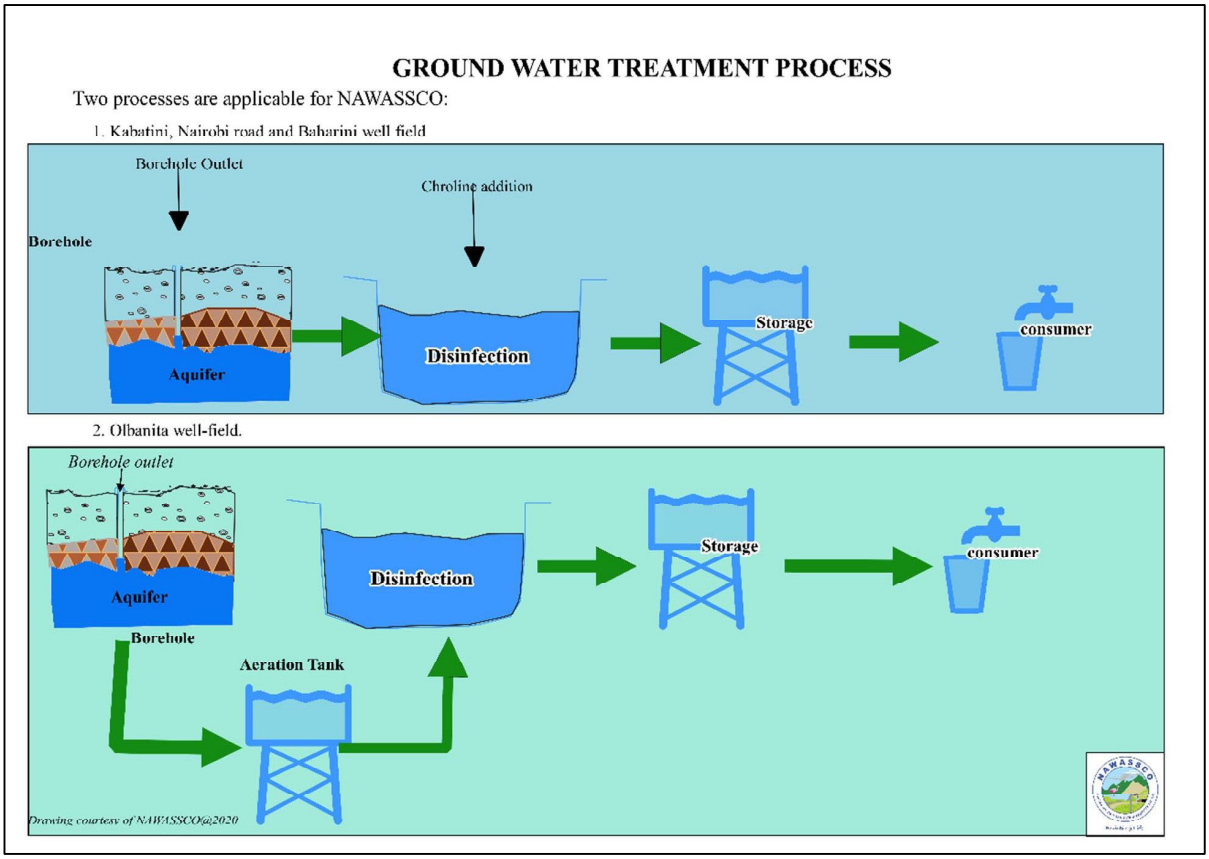
	Avg: 50 mg/L
	min.: 10mg/L
Chlorine lime	
Form	Lump
Stock volume	60 day's quantity
Dosing method	Gravity
Dosing rate, max.	Max: 2.5 mg/L
	Avg: 1.5 mg/ L
	Min: 1.0mg/

Source：NAWASSCO



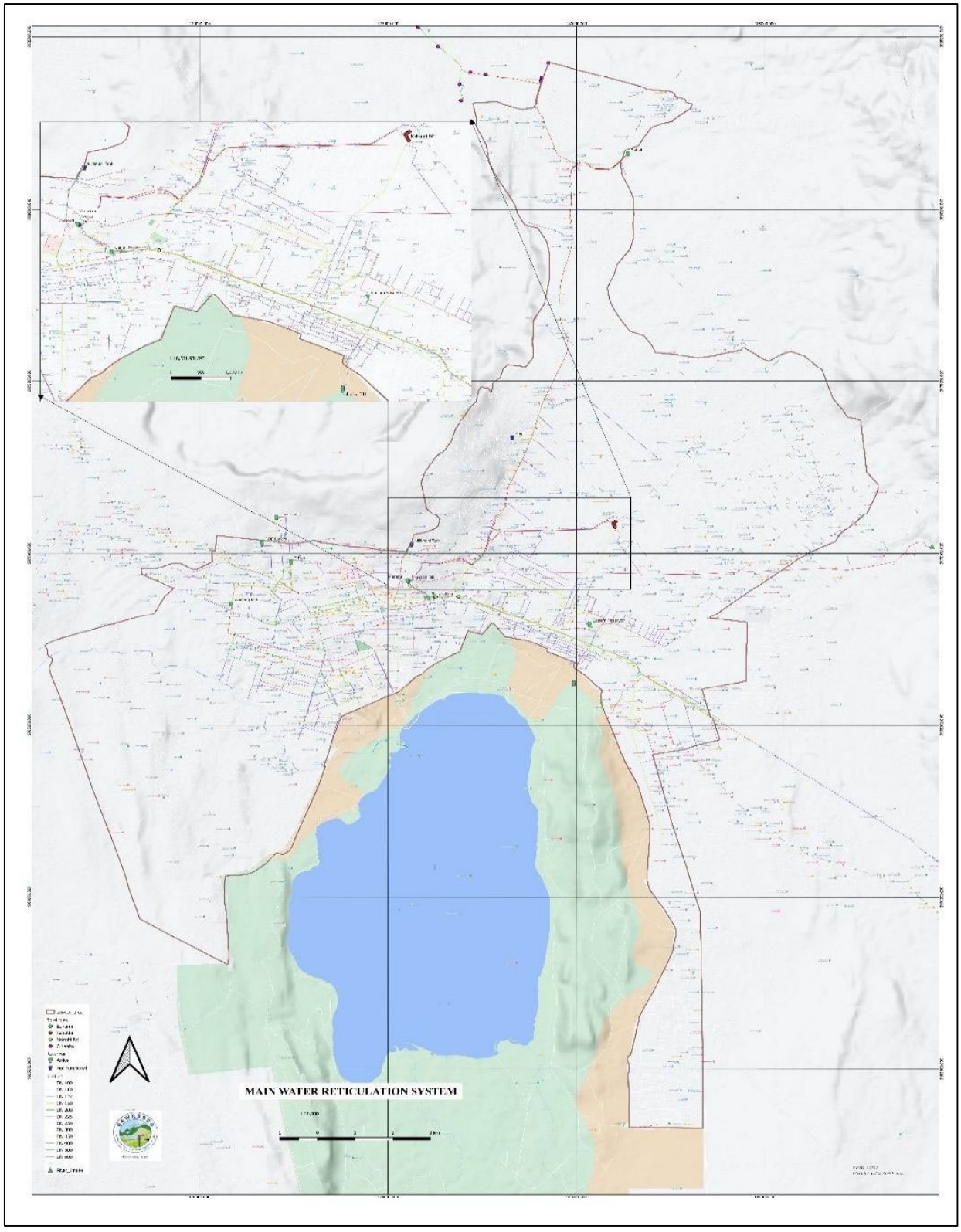
Source：NAWASSCO

Figure 6 Malewa Treatment Works



Source：NAWASSCO

Figure 7 Groundwater Treatment Process



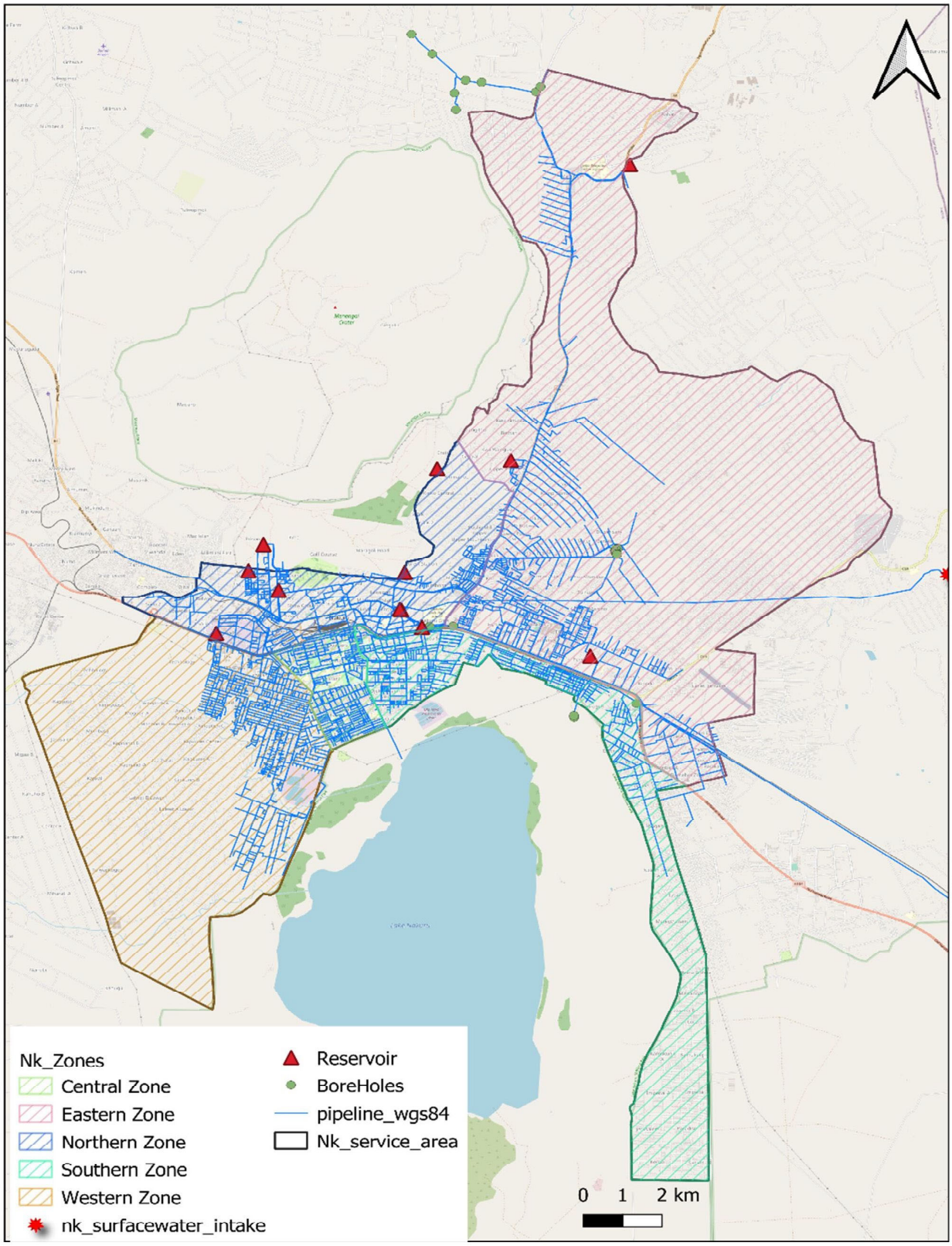
Source：NAWASSCO

Figure 8 Transmission Mains

Table 3 NAWASSCO Reservoirs

Location/Area	Name	Capacity m^3	X-Section	Year constructed	Material	Type	Status
Eastern Zone	Eastern Reservoir	4,000	Rectangular	1990	Concrete	Ground mounted	Active
Western Zone	Western Reservoir	6,000	Rectangular	1990	Concrete	Ground mounted	Active
	Prison Road Reservoir	1,000	Rectangular	1990	Concrete	Ground mounted	Active
	Bahati Reservoir	2,500	Rectangular	2009	Concrete	Ground mounted	Active
	Nairobi road Reservoir	3,375	Rectangular	1964	Concrete	Ground mounted	Active
Central, Southern & Western Zone	Mereroni Reservoir	3,375	Cylindrical	1983	Concrete	Ground mounted	Active
Northern Zone	Milimani High Level Reservoir	1,000	Rectangular	1983	Concrete	Ground mounted	Not functional
Eastern & Western Zone	Malewa Reservoir	1,000	Rectangular	1952	Concrete	Ground mounted	Active

Source：NAWASSCO



Source：NAWASSCO

Figure 9 Distribution Mains

Table 4 Distribution Mains

NAWASSCO WATER RETICULATION PIPEWORK BREAKDOWN				
	LENGTH IN AGE (M)			
AC	**0-10 YEARS**	**10-20 YEARS**	**>20 YEARS**	**TOTALS (M)**
DN 100			2017	**2017**
DN 150			3803	**3803**
DN 200			1618	**1618**
DN 225			10939	**10939**
DN 250			23740	**23740**
DN 300			1725	**1725**
DN 600			33378	**33378**
DN 75			2906	**2906**
GI				
DN 100			2266	**2266**
DN 150			10436	**10436**
DN 200			866	**866**
DN 225			14249	**14249**
DN 250			1388	**1388**
DN 300			1338	**1338**
DN 32			909	**909**
DN 350			15087	**15087**
DN 400		3043	15277	**18320**
DN 50			820	**820**
DN 500			940	**940**
DN 75			262	**262**
HDPE				
DN 100	2374	718		**3092**
DN 150	1380	1002		**2382**
DN 200	1312	619		**1931**
DN 250	2004			**2004**
DN 32	1621	220		**1841**
DN 40	1190	798		**1988**
DN 400		281		**281**
DN 50	670	1911		**2581**
DN 75	5470			**5470**
PVC				
DN 100	24444.994	51251.976	47482.97	**123179.94**

DN 150	19151.9108	33790.5082	31715.419	**84657.838**
DN 200	848.4504	5374.8016	4242.252	**10465.504**
DN 225	26.1555	729.422	130.7775	**886.355**
DN 25	3947.3973	6581.1992	3478.9865	**14007.583**
DN 250	346.157	1959.128	1730.785	**4036.07**
DN 300	997.5441	3990.1764	16402.6305	**21390.351**
DN 32	15064.4581	3973.8624	1612.3205	**20650.641**
DN 350	494.7397	1978.9588	2473.6985	**4947.397**
DN 40	18026.33193	19759.3444	13594.48967	**51380.166**
DN 400	811.3595	3245.438	17154.9275	**21211.725**
DN 50	47129.869	69564.521	93582.48	**210276.87**
DN 75	19873.411	40618.55567	44885.77333	**105377.74**
TOTALS (M)	**167183.7783**	**251409.8917**	**422451.51**	**841045.18**

Source：NAWASSCO

WSP-8

Nanyuki WSP (NAWASCO)

Project for Strengthening Capacity of Water Service Providers on Formulating Bankable Project Plans

Questionnaire (NAWASCO)

No.	Questions	Answers
1	Are you willing to borrow the money from commercial bank when selected as target WSP?	Yes.
2	Kindly specify last 10 years project with major project comportment and amount, and source of fund for each project.	Refer to Table 1.
3	Kindly provide the WSP long term plan with annual budget for O&M and investment for water supply system.	【Strategic Plan 2019-2024】 【Strategic Plan 2019-2023】
4	Do you currently offer or intended to be offer any fund from doner, AOB, OBA, KPWF, own fund or any others? If yes, kindly provide the detail.	Yes. • AOD from WSTF: Sanitation Project • WAHFIN: Customer Meter Replacement
5	Kindly provide the documents listed in Attachment 1 to 6 and Data Collection List.	Noted.
6	Kindly fill in the details for the overview of water supply facilities as shown in Attachment 1 to 6.	【Attachment 1 to 6】
7	What is the reason for the inactive connections?	■ No payment ■ No water due to technical problem such as no pressure, blockages and so on □There is any other alternative source. □ Deactivate the account during rainy season □ Any other reason, if any please specify
8	What kind of sensitization for the inactive connections to reconnection have been carried out?	• SMS: Send Customized messages to the customers
9	Kindly provide the current total water demand (m^3/day) with calculation method and excel file.	2019: 15,165 m^3/day
10	Kindly provide the details for the water demand projection with calculation method and excel file.	2030: 24,633.55 m^3/day 2040: 34,748.06 m^3/day
11	Challenges Faced in the Water Supply Facilities 1) Potential of Water Source	□ Enough to develop the future demand □ Enough for current demand ■ Not enough ■ Need additional water sources (Surface water)

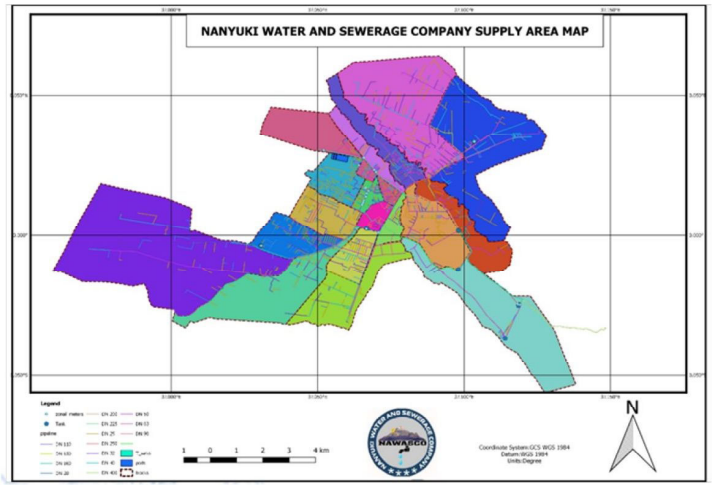
No.	Questions	Answers
	2) Raw Water Quality	■ Meet the standard for drinking purpose □ Meeting the standard but deteriorating
	3) Intake Facility Intake Volume	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand
	Facility Condition	■ Good (Boreholes) □ Fair ■ Deteriorating but can utilize (Surface water) □ Need rehabilitation and augmentation
	4) Raw Water Transmission System Transmission Volume	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand
	Facility Condition	□ Good □ Fair □ Deteriorating but can utilize ■ Need rehabilitation and augmentation
	5) Water Treatment Plant Treatment Volume	 □ Sufficient for future water demand □ Sufficient for current demand ■ Not sufficient for current demand
	Facility Condition	□ Good □ Fair □ Deteriorating but can utilize ■ Need rehabilitation and augmentation
	6) Water Distribution Systems Water Pressure	□ Meeting the standards for water pressure □ Not all area meeting the standards for water pressure ■ Not meeting the standard when high demand □ Not meeting the standard
	7) Household Connection	■ Using the saddle clamp with cock □ Using the saddle clam □ Using the tee

No.	Questions	Answers
	8) Water Meter	■ Using the piston type (Mostly) ■ Using propeller type Reason of selecting above:
	9) Non-Revenue Water (NRW) Reason and each percentage	■ Old pipe (61%) □ Poor material use □ High pressure ■ Meter inaccuracy (31%) □ Illegal connection □ Poor workmanship ■ Others: Unbilled authorized (8%)
	10) Billing System How do you read the water meter? What kind of software for billing system is using?	□ By manual ■ By smart Phone □ By smart meter ■ Enterprise Resource Planning (ERP) □ JICS □ Other

Attachment-1: Main Water Source

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of water source and intake facility	① Boreholes (Nanyuki High, Yard, Njoguiini, Katheri) ② Surface water (Nanyuki River, Likii River) 【FINIX Detailed Design Report】		
2	Specifications of water source and intake facility	① Boreholes (Nanyuki High, Yard, Njoguiini, Katheri)	• Water source capacity: 2,630 m^3/day • Intake capacity: 65 m^3/hours, 1,578 m^3/day • Year Built: N/A • Structure of intake facility (Elevation + N/A masl): ◆ Intake well: N/A ◆ Grit chamber: N/A ◆ Pump: N/A 【FINIX Detailed Design Report】	
		② Surface water (Nanyuki River, Likii River)	• Water source capacity: N/A m^3/day • Intake capacity: 500 m^3/hour, 12,000 m^3/day • Year Built: N/A • Structure of intake facility (Elevation + N/A masl): ◆ Intake well: N/A ◆ Grit chamber: N/A ◆ Pump: N/A 【FINIX Detailed Design Report】	
3	Outstanding annual and seasonal fluctuation / trend, if any	N/A	【FINIX Detailed Design Report】	
4	Future development plan	N/A	【FINIX Detailed Design Report】	

Attachment-2: Management Structure and Area of Coverage

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location of water supply area / county	① Nturukuma ② Sweet Waters ③ Central Business District 【FINIX Detailed Design Report】 		
2	General information of water supply area / county	① Nturukuma ② Sweet Waters ③ Central Business District	【FINIX Detailed Design Report】	

Attachment-3: Water Treatment Plant (WTP)

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of WTP	① New Nanyuki WTP ② Old Nanyuki WTP 【FINIX Detailed Design Report】		
2	Specifications of WTP	① New Nanyuki WTP	• Type of treatment: Convectional treatment process with Coagulation, flocculation, sedimentation, aeration, rapid sand filtration + disinfection • Current treatment capacity: 11,000 m^3/day • Design treatment capacity: 11,248 m^3/day • Year Built: N/A • Structure of main facility: N/A 【FINIX Detailed Design Report】	
		② Old Nanyuki WTP	• Type of treatment: Convectional treatment process with Coagulation, flocculation, sedimentation, aeration, rapid sand filtration + disinfection • Current treatment capacity: 1,000 m^3/day • Design treatment capacity: 3,410 m^3/day • Year Built: N/A • Structure of main facility: N/A 【FINIX Detailed Design Report】	
3	Water treatment conditions	① New Nanyuki WTP	• Utilization of plant capacity: 98 % • Hours for WTP Utilization: 24 • Flow diagram of the water treatment process: N/A • Type and amount of chemicals used during the process for during the dry and rainy seasons: ◆ PAC: N/A kg/day ◆ Sodium hypochlorite: N/A kg/day ◆ Concentrated sulfuric acid: N/A kg/day ◆ Lime: N/A kg/day • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor cost: N/A ◆ Chemical cost: N/A	

			◆ Electricity cost: N/A ◆ Maintenance cost: N/A ◆ Other cost: N/A 【FINIX Detailed Design Report】	
		② Old Nanyuki WTP	• Utilization of plant capacity: 30 % • Hours for WTP Utilization: 24 • Flow diagram of the water treatment process: N/A • Type and amount of chemicals used during the process for during the dry and rainy seasons: ◆ PAC: N/A kg/day ◆ Sodium hypochlorite: N/A kg/day ◆ Concentrated sulfuric acid: N/A kg/day ◆ Lime: N/A kg/day • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor cost: N/A ◆ Chemical cost: N/A ◆ Electricity cost: N/A ◆ Maintenance cost: N/A ◆ Other cost: N/A 【FINIX Detailed Design Report】	
4	Water quality test	① New Nanyuki WTP ② Old Nanyuki WTP	• Main items to be tested in each process and frequency of the test (raw water, after treatment and so on): N/A • Compliance with water quality standards: N/A	
5	Future development plan	N/A	【FINIX Detailed Design Report】	

Attachment-4: Water Transmission Mains to Reservoir

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of transmission pipeline	Refer to Table 2. 【FINIX Detailed Design Report】		
2	Specifications of Pipeline	N/A	• Location, materials, diameter and length of each pipeline Refer to Table 2. 【FINIX Detailed Design Report】 • Year Built: for each pipeline: N/A • NRW of main transmission line: N/A % • Transmission pump: N/A	
3	Future development plan	N/A	【FINIX Detailed Design Report】	

Attachment-5: Reservoirs

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of Reservoir	10 Reservoirs. 【FINIX Detailed Design Report】		
2	Specifications of reservoir	10 Reservoirs	• Current capacity: 8,275 m^3 • Year Built: N/A • Structure of main facility: ◆ Reservoir: N/A ◆ Distribution pump: N/A ◆ Water flow measurement facility: N/A ◆ Generator facility: N/A 【FINIX Detailed Design Report】	

3	Operation and maintenance and Water quality test	10 Reservoirs	• Flow diagram of reservoir: N/A • Type and amount of chemicals used before distribution if any: N/A ◆ Sodium hypochlorite: N/A • Annual Operation and maintenance cost and its breakdown: N/A ◆ Labor / maintenance cost: N/A ◆ Electricity cost: N/A ◆ Other cost: N/A • Main items to be tested in reservoir: N/A • Compliance with water quality standards: N/A 【FINIX Detailed Design Report】	
4	Future development plan	N/A	【FINIX Detailed Design Report】	

Attachment-6: Water Distribution Mains

No.	Items	Details / Numbers / Specifications / Conditions		Note
1	Name and location map of distribution pipeline network	Refer to Table 2. 【FINIX Detailed Design Report】		
2	Specifications of Pipeline	N/A	• Location, materials, diameter and length of each pipeline Refer to Table 2. 【FINIX Detailed Design Report】 • Year Built: for each pipeline: N/A • NRW of main transmission line: N/A % • Transmission pump: N/A	
3	Future development plan	N/A	【FINIX Detailed Design Report】	

Table 1 Summary of NAWASCO Previous Funded Projects

No	Project Name	Project components	Project cost (KES million)	Financier	Year completed	Current Status
1	Solio settlement scheme Water project	▪ Rehabilitation of intake ▪ 31.05km gravity mains ▪ 37.2 km distribution lines ▪ Construction of 2 masonry water storage tanks (225m^3 each) ▪ Construction of office block ▪ Accompanying measures on catchment conservation ▪ Last mile- 65Km tertiary lines	143	Government of Finland and Government of Sweden-through Water Sector Trust Fund- **120m** Laikipia County- 23m **Total- 143m**	2019	Operational
2	Katheri Nyariguni Water project	▪ Construction of 108m^3 elevated steel tank- which was to address both pressure and increase storage; ▪ Construction of 22.23km pipeline extension- to reach out to new consumers ▪ Procurement and Installation of 228 water meters as accompanying measures to the project.	22.2	Water Sector Trust Fund	2018	Operational
3	Majengo Thingithu water project	▪ Replacement of 23.7km Pipeline with HDPE ▪ Construction of 1No. Water kiosk	19	Water Sector Trust Fund	2017	Operational

4	Ngei Water Project	▪ Network re-alignment and upgrade to HDPE-4.3km of dia. 63mm to 40mm ▪ Installation of zonal meters for monitoring NRW-2No, DN 63mm ▪ Consumer connection transfers 298No. from old to new connection ▪ Replacement of old consumer meters 298No, R250, 15mm	7.1	Water Sector Trust Fund	2022	Operational
5	Elevated steel tanks	▪ Construction of 2No Elevated Steel tanks of 108m^3 each	8.5	NAWASCO	2022	Operational
6	Makurian-Osirua Water Project	▪ Construction of 3No. Masonry tanks of 225m^3 each ▪ Construction of 2No. Masonry tanks of 135m^3 each ▪ Construction of 2No. Masonry tanks of 75m^3 each ▪ Rehabilitation of intake ▪ 7.63Km Gravity main ▪ 28.8Km Transmission lines ▪ 40.41Km Distribution lines	97.5	Laikipia County through Kenya Devolution Support Programme KES 97.5million	2022	Testing Phase

Source：NAWASCO

Table 2 Summary of Existing Mainlines

Pipeline	Pipeline capacity m^3/day	Discharge m^3/s	Pipe length (m)	Pipe Diameter (mm)	Total Head Loss	Terminal Head available (m)
Main distributor (from Old t/works)	1500	0.0174	3,005	DN 160 AC class B	29.84	38.53
Transmission pipe to Nanyuki tank	700	0.0130	1,248	DN 110 AC class D	16.77	62.72
Transmission pipe to the Army tank	700	0.0116	652	DN 110 AC class D	14.78	61.23

Source：NAWASCO