



**REPUBLIC OF MOZAMBIQUE
MINISTRY OF PUBLIC WORKS, HOUSING AND WATER RESOURCES**



**WATER SERVICES AND INSTITUTIONAL SUPPORT PROJECT II
(WASIS II)**

IDA Grant D110

WATER TREATMENT PROCESS ADVISOR

Contract Nr. FIPAG/WASIS II/CON-10/18

TERMS OF REFERENCE

March, 2021

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Terms of Reference for

WATER TREATMENT PROCESS ADVISOR

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TERMS OF REFERENCE

FOR

WATER TREATMENT PROCESS ADVISOR

1. BACKGROUND

1.1. General

The Republic of Mozambique has received a credit from the International Development Association toward the cost of the **Water Services and Institutional Support II Project (WASIS II)**, and it intends to apply part of the proceeds of this credit to payments under the Contract for the **Water Treatment Process Advisor**.

The Government of Mozambique (GoM) is implementing reforms in the urban water supply sector aimed at improving coverage, quality and efficiency of services. The reform program has involved the reorganization of sector Governance mechanisms, which have facilitated a transition towards decentralized water supply operations and management, including service regulation, investment planning, and private sector participation in operations.

More specifically, the GoM has taken steps to provide for:

- Reduced operating costs and increased efficiency, particularly through involving private sector in operations for water supply services in 21 major cities; Maputo, Matola, Boane, Beira, Quelimane, Nampula, Pemba, Dondo, Chokwe, Xai-Xai, Inhambane, Maxixe, Tete, Moatize, Chimoio, Manica, Gondola, Lichinga, Cuamba, Angoche and Nacala;
- Tariff adjustments that support financial sustainability; and
- Establishment of a Regulatory Board for the sector, which considers both service quality and financial performance.

The GoM's implementation agency for the urban water program is Fundo de Investimento e Património do Abastecimento de Água– FIPAG (Investment Fund and Water Supply Asset Holder).

FIPAG is responsible for the water supply systems infrastructure in the 21 cities and for the future investment in the systems. The program for urban water supply also includes investments in rehabilitation, operation and maintenance of systems. It has the mandate to ensure that the public receives an adequate and safe water supply that meets Mozambique standards for health and hygiene (the public service obligation), and is empowered to ensure that these systems achieve autonomous, efficient and financially sustainable water supply operations.

The WASIS II Project, funded by the World Bank, includes in its objectives, amongst others, the improvement of the performance, sustainability and coverage with reliability of water supply services in the cities of Beira, Dondo, Tete, Moatize, Nacala and Pemba. In this regard, several construction activities are planned for the above listed towns, which includes rehabilitation and expansion of the intake works, treatment, transportation, storage and distribution infra-structures.

The Greater Maputo Water Supply Project (GMWSP), also funded by the World Bank, is reaching the end of its construction period, requiring the start-up operation, testing and transfer of the 60,000m³/day WTP, Pumping Stations, Transmission main as well as various Distribution Centers.

The Water Treatment Process Advisor to be hired under these terms of reference shall provide assistance to FIPAG during start-up operation testing and commissioning of the rehabilitated and constructed treatment facilities in the above listed cities, including the Greater Maputo.

In addition to the above listed cities, the WTP Advisor shall also support FIPAG in all other cities under of FIPAG management, whenever is requested to provide assistance.

2. SCOPE OF SERVICES AND SPECIFIC RESPONSIBILITIES

The scope of the consultancy services is to provide technical assistance to the client for the preparation, design review, implementation and optimization of treatment plants projects under the program as well as the FIPAG's operations maintenance support and propose the planning strategy for future water treatment infrastructure design

The consultant shall ensure that all projects related activities are carried out in accordance with the standards and best industry practice, while at all time ensuring quality, cost effectiveness and timely completion. He/she will mentor and build the capacity of FIPAG staff in developing and improving technical knowledge and understanding in treatment process of water and related infrastructure design and construction. To assist the Client with review and approval of proposed process designs.

The Consultant shall assess the condition of the existing treatment infrastructure and process and propose optimization measures, when required. He/She shall also assist the Client with preparation of regular status reports for the program and other reports that may be required, together with all related technical assistance and professional advice to the Client related to program implementation.

The Water Treatment Process Advisor will not be required to be based in FIPAG office for full time, hence He/She can perform some of the activities under this assignment from his/her office either in Mozambique or from other country. However, He/She will be required to visit the cities under FIPAG management and/or where FIPAG is or will be implementing works.

Key activities of the Water Treatment Process Advisor shall include but not be limited to the following, divided into two groups, namely the activities to be performed from Mozambique and these to be performed from his/her home office:

A. Services to be performed from Mozambique

Visits to Mozambique will be arranged from time to time, during which the services of the Water Treatment Process Advisor will be used as required by the needs at the time and would consist of at least the following activities:

- Visit various water supply systems in the cities under FIPAG management for an assessment of the status of each element of the system in order to identify rehabilitation needs and/or changes required to improve the efficiency of the water treatment process system, including energy consumption, in a cost-effective way. This will include a review of the water treatment operation system and improvements required in this

regard leading to clear recommendations regarding optimization of each water treatment system. The findings and recommendations shall be included in a water treatment status and optimization report for each water treatment plant, which shall also be presented to FIPAG in order to agree on the allocation of responsibilities for the implementation of the report's recommendations. In this regard, flexible approach to work including occasional to regular construction site visits will be required.

- The assessment and recommendation of required improvements of the treatment process efficiency regarding reduction of chemical consumption through the recommended use of more efficient chemicals and process, as an important component of the assignment, considering availability of the chemical products in the region in general and in Mozambique, in particular.
- Visit ongoing works contracts and assist FIPAG to improve its day-to-day contract management and supervision of the works contracts as well as improvement of Quality Control, mainly on water treatment related aspects;
- Assist with the inspection, testing, commissioning and transfer of the 60,000m³/day WTP currently under construction in the Greater Maputo Project.
- When visiting construction sites, participate in site inspections to assess the fulfilment of the technical specifications with regard to the quality of equipment and its installation under the projects as well as on the operation of all WTP equipment and process;
- Witness commissioning procedure of urban water systems, as requested, and make appropriate recommendations to adequate ensure operational procedures including staff operation and maintenance training as well as safety provisions for operation of the plant;
- Train FIPAG head office and FIPAG operations staff members based on training programs developed by the contractors regarding the operation of the recently rehabilitated or constructed WTPs, and thereafter on a day-by-day basis to transfer skills on WTP matters, and to assure their ability to execute their duties and tasks in an effective manner;
- A yearly follow-up visits to cities in order to assess the improvements made and identifies further shortcomings requiring rehabilitation, maintenance and improvement of operation. Again, this will require a report for each city with recommendations, which shall be presented to FIPAG.

B. Services to be performed from home office, when requested

Apart from the time spent in FIPAG office and sites throughout the assignment, the Water Treatment Process Advisor will from time to time be contacted by e-mail or through online platform to provide his expert opinion regarding the following actions, including others in his field, related to FIPAG's water treatment infrastructure:

- Assist in preparation and/or review of TORs for hiring WTP related services as well as provide a specialized opinion regarding the water treatment components of urban water systems in tender documents, especially Employer's requirements, drawings and specifications, participate in technical evaluation of proposals or bids and contract documentation;
- Provide inputs and recommendations on the implementation of Consultancy and works contracts, including review of deliverables (such as WTP design reports), quality control, time and cost on the implementation of the works contracts, mostly on treatment process design. This shall include specialist reviews and recommendations to FIPAG

on the WTP layout, the effectiveness of the WTP works, construction methodology and related issues that could have a negative impact on the cost and sustainable operation and delivery of potable water that meets the Mozambican standards and health requirements and, if omitted, use WHO recommendation. Apart from that, the Consultant shall also participate in workshop to be organized with all stakeholders for the presentation of WTP design reports;

- Assist FIPAG with review and comments and/or approval of any Consultant or Contractor's proposal for design changes, variations or adjustments required during the implementation of the project;
- Review and comment on the proposed work plans related to installation of WTP components and related aspects as required in the project and for operation and maintenance;
- Review Contractor's method statements and submit recommendations to FIPAG for appropriate decisions or approval;
- Other water treatment process related tasks in urban water system construction, operation and maintenance.

3. OUTPUTS

The outputs under this assignment shall be as detailed below:

3.1 Inception Report

An Inception Report shall be prepared and presented to the Client not later than 1.5 month after the start date.

In addition to the program, the Inception Report shall summarize the results of the data collection and then describe the approach the Consultant intends to follow in the development of the various tasks and sub-tasks associated with the assignment. Additionally, the Consultant shall address any differences between the ToR and the information found either from data collection or from site investigations activities or any other challenges that may affect the scope, cost and/or timeline for the implementation of the assignment. He/she shall also discuss the strategies he/she intends to adopt in order to address such differences or challenges.

3.2 Project and tender documents review and recommendations

This report shall address comments and recommendations related to review of WTP design reports of Tete and Nacala cities, including calculations, description, construction drawings, technical specifications, etc. In this regard, the Consultant shall also carry out:

- Review of bidding documents, including Works' requirements, specifications, etc, for selection of Contractors for execution of the works for rehabilitation, expansion or construction of new WTP facilities.

3.3 Water Treatment Plant Process Assessment Report

The report shall address the outcome of the assessment on the status of the existing water treatment plants, in order to identify rehabilitation needs and any changes required to improve the efficiency of the system in a cost-effective way, including optimization of chemicals and energy consumption. Apart from the findings and recommendations, the report shall include a clear and detailed work plan and methodology describing the needs

identified during the inspection visits, training needs and periods to be spent in each city in order to improve the performance, as well as proposed allocation of responsibilities for the implementation of the report's recommendations.

3.4 FIPAG water treatment procedures

This report shall include a review of the operation and procedures of the existing water treatment facilities by the local staff and recommendations on the improvements required in this regard. Clear recommendations regarding operation shall be included in the report. The Consultant shall prepare a consolidated water treatment procedure report per Region (total of 4 regions) in order to assure implementation of the recommendations that have been arose from the assessment report.

3.5 Water Treatment Generic Training Manual

This manual shall be used for training of FIPAG staff engaged in water treatment activities and shall include WTP operation, water quality analyses, water quality laboratory management program and quality control. This task shall be implemented in liaising with FIPAG Training Academy. The manual should consist of straight forward guidelines and forms for water treatment procedures.

3.6 Water Treatment Process Training Report

The Consultant shall organize and undertake training sessions to FIPAG staff estimated to last a week, per Region, based on assessment report, to be implemented in coordination with FIPAG Training Academy. The assessment report shall provide guidance on the need for formal training (at the plant) and/or on-the-job training during site visits or in specific training missions that may be proposed by the Advisor, based on the training needs assessment for each city.

3.7 Technical recommendation on the FIPAG Academy training program

The Consultant shall produce a consolidate report addressing technical recommendation on the FIPAG Water Treatment training program in order to improve training manuals already developed in this regard, based on findings gathered during the training session of FIPAG staff. The weak and strong points of the existing programs shall be clearly described to lead to easy understanding of the Consultant recommendations. This report shall also include well motivated recommendations for adjustments or changes of the existing training program.

3.8 Commissioning and recommendation Report

This report shall address commissioning procedures of urban water systems and make appropriate and adequate recommendations to ensure operational procedures including staff operation and maintenance training as well as safety provisions for operation of the plant related to Works in Maputo, Pemba, Beira, Tete and Nacala cities. This report shall be prepared following attendance to the commissioning of the WTP facilities rehabilitated and/or constructed in the cities above listed.

3.9 Other various short review reports

The following requests for advisory opinion related to the WTP process shall also be considered:

- *ToRs and RFPs* – this shall include preparation or review of ToRs and requests for proposals (RFP) for hiring services for design of rehabilitation, expansion or

construction of new WTP facilities. ToRs for any other WTP related assignments may be included;

- *Site visit reports* – any site visit shall be completed with a site visit report, covering all findings and recommendations related to WTP construction works and operation.
- *Construction submittals review reports* - this report shall address comments arising from review of proposed method statements, design changes, VOs, work plans throughout the implementation of works contracts;
- Contribution towards the annual Project Implementation Reports;
- Attendance to evaluation panels and preparation of inputs to tender evaluation reports, for tenders covering rehabilitation, expansion or construction of new WTP facilities,
- *Other documents*, reports, training materials, presentations, etc, as and when required to meet the key responsibilities defined above.

3.10 Brief Assignment Report

The Brief Assignment Report shall be submitted at the end of the contract period. In the preparation of this report, the Consultant shall summarize all activities executed during the assignment, recommendations for further inputs and outputs produced. He/she shall also highlight the key recommendations to be carried forward with regard to FIPAG water treatment procedures and FIPAG Academy training program.

4. QUALIFICATIONS AND EXPERIENCE REQUIRED

The Water Treatment Process Advisor shall possess the following qualifications and experience:

- An MSc degree in Chemical, Water Supply, Environmental, Civil Engineering or similar, relevant to the water treatment process.
- He/ She must have at least 15 years of cumulative general experience related to Civil Engineering studies, designs and construction associated to WTP projects construction, rehabilitation and/or operation and maintenance.
- Demonstrate knowledge of design and construction best practice, standards and specifications related to water treatment process engineering as applied to the Water/Sanitation sector, through training certificates (at least 3 certificates within the last 5 years).
- He/ She must have had, in the last ten (10) years, specific experience in delivering treatment plant processes within the engineering design and construction environment, and in water laboratory equipment installations of similar complexity.
- He/ She must demonstrate having actively participated in detailed studies (designs) and construction of at least two (2) water treatment plants projects in the tropical weather region, as a water treatment process expert.
- Demonstrate experience in FIDIC based contracts, familiarity with Mozambican national policies and procedures within the water sector as well as experience of International Donor Funded Projects (ADB, French Development Agency, Orio or World Bank).

- Be highly motivated and with a strong desire to promote technical excellence within project teams.
- Fluent in English language both written and spoken, with particular emphasis on report writing and contractual correspondence. The working language, all reports and communications, will be in English however, during the implementation of the assignment the Consultant may meet some Portuguese speakers with no ability to communicate in English. Therefore, Portuguese knowledge will be an advantage.
- The applicant shall provide:
 - (i). Full time contact mail address and mobile phone numbers,
 - (ii). Contact details of his/her references (Clients/Employees) in the last 5 years and,
 - (iii). Names of three referees and their contact (email addresses and mobile/cell telephone numbers).

5. TIME REQUIREMENTS

The Water Treatment Process Advisor will be directly contracted to FIPAG for a part time involvement over a period of two years. He/ She will not be required to be based at FIPAG office, hence he/she can do some of his assignment activities from his/her home office, but will be required to visit Mozambique from time to time when he will be based in the FIPAG Head Office in Maputo. During his time in Mozambique, he will be required to visit the systems in all of the cities under FIPAG's responsibility, including where FIPAG is or will be implementing or preparing implementation of construction projects, as required. He/she will be required to liaise closely with the FIPAG Central Services for Projects and Investments, Central Services for Operations and Great Maputo Water Supply Project Office.

The total Consultant time input is estimated at 8 person-month (180 working days, of which about 40 working days will be allocated to the Greater Maputo Project) input over a 24 months period and the Contract can be renewed if agreed by both parties.

The assignment shall be implemented based on a working time schedule to be motivated by the Consultant and approved by FIPAG based on the assessment report per city.

The Consultant will be required to visit Mozambique for at least 5 periods of approximately one month each, spread over the two years, to be agreed at contract negotiation stage, and updated the time allocation during the assessment report review. It should be noted that this assignment may start while the COVID 19 restrictions are still in place and that the trips could have to be adjusted in order to be as much productive as possible within the restrictions and possible need for quarantine periods for a specialist from outside Mozambique. In preparation of his/her application, the Consultant shall consider any actions or measures that may be required during the implementation of the assignment, due to COVID 19.

6. REPORTING REQUIREMENTS

All documents, correspondence, instructions, communications, etc related to the assignment shall be in English. This principle shall apply to the Client, Consultant, Suppliers, Contractors and any other associated party.

The Consultant will report formally to FIPAG's Director General, Mr. Victor Tauacale through the WASIS-II Project Coordinator and liaise with the FIPAG Operations Director, FIPAG Greater Maputo Water Supply Project Director and FIPAG Regional Directors, and their designated representatives and counterparts.

7. FORM OF CONTRACT AND PAYMENT

The Contract will be a lump-sum assignment for the provision of technical assistance. Payment will be based on Consultant's invoices which will be submitted as applicable, in line with the delivery schedule of the results agreed in the contract and work schedule.

The schedule of submission and payments of the deliverables, in proportion to the total sum of the assignment are given below. However, any changes deemed necessary may be considered, subject to an acceptable motivation and agreement to be met at the contract negotiation stage:

Item	Description	Time Schedule	Payment
1	Inception Report	1.5 month after start date (SD)	5% of Contract amount
2	Project and tender documents review and recommendations		
2.1	Tete WTP	2.5 months after SD	5% of Contract amount
2.2	Nacala WTP	3.0 months after SD	5% of Contract amount
3	Water treatment plant assessment report for		
3.1	FIPAG Maputo Region	5.5 months after SD	7.5% of Contract amount
3.2	FIPAG South Region	8.5 months after SD	7.5% of Contract amount
3.3	FIPAG Central Region	11.5 months after SD	7.5% of Contract amount
3.4	FIPAG Northern Region	14.5 months after SD	7.5% of Contract amount
4	FIPAG water treatment procedures		
4.1	FIPAG Maputo Region	15.5 months after SD	5.5% of Contract amount
4.2	FIPAG South Region	16.5 months after SD	5.5% of Contract amount
4.3	FIPAG Central Region	17.5 months after SD	5.5% of Contract amount
4.4	FIPAG Northern Region	18.5 months after SD	5.5% of Contract amount
5	Water treatment generic training manual		
5.1	Water Treatment Training Manual	20.0 months after SD	5.25% of Contract amount
5.2	Water Treatment Training Sessions Report for Maputo, South, Central and Northern regions	22.5 months after SD	5.0% of Contract amount
5.3	Technical recommendation on the FIPAG Academy training program	23.0 months after SD	5.25% of Contract amount
6	Commissioning and recommendation Report		
6.1	Maputo WTP	4.0 months after SD	2.5% of Contract amount
6.2	Pemba WTP	14.0 months after SD	2.5% of Contract amount
6.3	Beira WTP	18.0 months after SD	2.5% of Contract amount
6.4	Nacala WTP	19.0 months after SD	2.5% of Contract amount
6.5	Tete WTP	21.0 months after SD	2.5% of Contract amount
8	Brief Assignment Report	23.0 months after SD	5% of Contract amount

The payment of remuneration fees will be subject to local/withholding taxes of 20% on the gross remuneration amount and should be shown separately on the bid and in the monthly invoices. The withholding tax will be paid by FIPAG.

The total amount to be paid to the Consultant for remuneration and reimbursable expenses shall not exceed the ceiling amount reflected in the Contract.

8. FACILITIES PROVIDED BY THE CLIENT

FIPAG will provide all necessary available information relevant to the assignment.

Transport between the place of accommodation and FIPAG office shall be the responsibility of the Consultant. Any travel to sites when required will be provided by FIPAG. If any travel away from Maputo is required, this and any overnight lodging will be paid for by FIPAG under reimbursable expenses.