



**Ministry of Environment and Energy
Republic of Maldives**

TERMS OF REFERENCE

Consultancy Services for the Construction Supervision of Provision of Sewerage Facilities under Provision of Water Supply, Sanitation and Solid Waste Management Project, Maldives

1. Introduction

The Government of the Republic of Maldives has received financing from the OPEC Fund for International Development (OFID), and intends to apply part of the proceeds for the following services: Consultancy Services for the Construction Supervision for Provision of Water Supply, Sanitation and Solid Waste Management Project, Maldives.

2. Background

The Maldives consist of 1190 low-lying coral islands spread over an area of 90,000km² in the Indian Ocean. Nearly 200 islands are inhabited, around 90 islands are resorts, and the rest are uninhabited. There are 26 geographical atolls which are grouped into 20 administrative atolls.

A large part of the population in the Republic of Maldives lacks the access to safe drinking water and improved sanitation facilities. Rainwater is the main source of potable water in the inhabited islands but it is available only during rainy months of the year. This causes the island population to rely on groundwater for drinking and cooking during dry period, mainly through domestic wells.

Wastewater disposal systems in most of the islands are developed within the plot known as onsite disposal systems (septic tank and soak pits), with rare cases of offsite disposals (near shore outfalls). In densely populated island environments, the construction, operation and maintenance of these systems is complex, mainly due to the short distance between domestic wells and septic tanks/soak pits, and often suffer from poor performance due to various reasons which include the absence of or limited desludging. Some small bore sewer systems (SBSS) have been introduced, but they often malfunction, and usually convey raw sewage directly into the near shore lagoon.

Sanitation facilities are poorly designed and constructed, which results in the contamination of groundwater and lagoon with the sewage effluent.

The island communities have therefore been facing the problem of groundwater contamination due to improper sanitation and over-extraction of groundwater. For a number of years, population and development pressures have led to increasing groundwater extraction, resulting in the depletion of the freshwater lens in many densely populated islands, which in turn has led saline intrusion into the groundwater aquifer. Groundwater resources have also been at risk of bacterial contamination caused by effluent leakage and pollution migration from poorly constructed and maintained septic tanks.

3. Focus Islands

- Island 1 – S. Hulhudhoo
- Island 2 – S. Meedhoo
- Island 3 – S. Maradhoo
- Island 4 – S. Maradhoofeydhoo
- Island 5 – S. Feydhoo
- Island 6 – S. Hithadhoo (funded by Government budget)

4. Scope of Works

Part I: Supervision and Coordination

Construction Supervision

The construction supervision phase of the project will be carried out during project implementation. Expected duration of the phase is **18 months**.

The Consultants will implement Construction Supervision including:

- Review of Designs:** the Consultant will review the detail designs made by the Design Consultants to ensure that it provides the product required and to verify that correct engineering practices were used in the design and ensure that the design meet the needs and the standards of the Client.
- Material Approval:** Approval of all the materials required for the works shall be checked, compared with specifications given in the proposals and design requirements and approved in a predefined clear process and records must be maintained in proper manner and share with the Client. Approvals shall be organized in a way not causing any delays to Contractors works.
- Coordination of works:** the Consultant will organize and direct execution of the works, by defining compliance with programmes and relations between stakeholders (MEE/PMU,

Contractors, Suppliers and third parties). Coordination will be ensured mainly by holding regular site meetings and general monthly meetings, with managers of the Contractors and Manufacturers, the MEE/PMU.

- d. **Supervision of field surveys:** the Consultants will supervise the Contractors who should carry out field surveys such as topographic, hydro-geological and geological surveys. The Consultants will prepare technical reports on all measurements made by the Contractor and will submit them to the MEE/PMU.
- e. **Identifying Special Studies:** in case the Consultants during progress of work come to the conclusion that special studies would be required to assist the Project Management Unit (PMU) in specific problems unforeseeable before conclusion of consulting contract, he will inform the MEE/PMU immediately and early enough to allow the Employer to arrange for such expertise.
- f. A **Quality Control and Quality Assurance Plan** will be developed by the Consultants to ensure that the structures are built and equipment installed in conformity with the Contractual Specifications, approved drawings, standards, good engineering practice and State-of-the-Art.
- g. A **Plan for Project Cost Control** will be developed on the basis of the field survey control and quantity survey required for determination of actual quantities of work accomplished by the Contractor(s) and Supplier(s) under direct guidance of the MEE/PMU, the Consultant will approve or reject the quantities of materials delivered, equipment erected, and works performed by the Contractor(s) and Manufacturer(s).
- h. **Plan for Project Progress Control:** using the same basic data as those established for project cost control, a progress chart will be maintained and updated in the Consultant(s) office. The work progress will be followed by the Consultant especially during the weekly works meetings on sites. A monthly report of weekly meetings will be established by the Consultant.
- i. **Representing the MEE/PMU:** the Consultants shall be the MEE/PMU's representative on site and shall perform all duties delegated by the MEE/PMU in writing in accordance with FIDIC. The Project Coordinator (PC) for the project will be appointed by the MEE/PMU in writing.
- j. **General Reporting** to Government & OFID. The Consultants will assist the MEE/PMU in supplying information related to the design and works progress to Government and OFID.

Works commissioning

The Consultants will implement Works commissioning including:

- k. Supervising the acceptance tests and preparing the **Completion Certificate** and the **Temporary Acceptance Certificate**.

- l.** Preparing the **Completion Report** which will be based on the record maintained during construction design and work supervision phases. It will include the environmental completion report which will be submitted to MEE/PMU for compliance with initial recommendations.
- m. Implement Shop Inspection of Electromechanical Equipment:** the Consultants will check the manufacturing of equipment and will attend tests of main items for acceptance as and when necessary. These tests concern mechanical tests and chemical analyses, routing tests and standard tests, dimensional checks and Non-destructive tests.
- n. Prepare ‘As-Built Drawings’.** The Consultants will prepare ‘As-Built Drawings’ during construction of works. On completion of the Project, the Consultants will submit to the Employer two (2) complete sets of all detailed drawings and computations in accordance with revisions made during the construction.
- o. Prepare Operation and Maintenance Manuals:** Based on the information and booklets received from the Contractors, Manufacturers, Suppliers and his own experience, the Consultants will prepare the Operation and Maintenance Manuals. He will complete the Manuals with the O&M recommendations identified in Part I.

Outputs of Part I:

- Contractors are properly supervised and coordinated as per MEE/PMU instructions.
- Quality Control and Quality Assurance Plans are issued.
- Various authorizations and instructions to the Contractor(s) and/or Manufacturer(s) being issued regularly.
- Plan for Project Cost Control update delivered monthly as per MEE/PMU instructions.
- Plan for Project Progress Control update delivered monthly as per MEE/PMU instructions.
- Works are temporarily commissioned, ‘As Built Drawings’ delivered and Operation & Maintenance Manuals issued.
- Weekly, monthly and final report.
- Training for the relevant staff.

Part II: Capacity Building and Performance Control over Defect Liability Period

Capacity Building

The Consultant will provide on-the job training to the counterpart staff on all aspects of the work carried out. Selected counterpart staff from each island will be attached to the Consultant’s team

for on-the-job-training in construction supervision. During construction stage the contractor will provide on-the-job training to the selected counterpart staff from the beginning of construction works.

After commissioning, the Consultant will organize a formal two weeks training for the operation and maintenance of the works rehabilitated or newly installed, followed by two weeks of practical exercises on sites.

Defect Liability of Contractors

The Consultant will carry out quarterly inspections during the one year defects liability period and instruct accordingly the contractors with regard to outstanding works and defects. After this period and satisfactory inspections, the Final Acceptance Certificate will be issued.

Defect Liability of the Consultants

The MEE/PMU will be in charge of validating the result of the work of the Consultants against the targeted objectives. Any additional consultancy needed for corrective actions that may occur for reaching the objectives will be under the responsibility of the Consultant (unless these measures could not be identified at the detailed design stage or are not under the responsibility of the Consultants).

Outputs of Part II:

- Key MEE/PMU staff are trained on the job and formerly;
- Defect liability of contractors has been controlled.
- Project Completion Report (PCR) to be submitted.

4.1 General Requirements

Coordination of works

The Consultant will monitor and report on the progress of the works liaising with MEE/PMU and the Contractors. Coordination will be ensured by holding regular site meetings and general monthly meetings, with managers of the Contractors and the MEE/PMU.

The Consultant shall establish a field office at each location/ island for the adequate operation and management of the tasks specified.

Quality Control and Quality Assurance monitoring will be carried out by the Consultant to ensure that the structures are built and equipment installed in conformity with the Contractual Specifications, approved drawings, standards and good engineering practice.

A Plan for Project Cost Control will be developed on the basis of the field survey control and quantity survey required for determination of actual quantities of work accomplished by the

Contractor. The Consultant will approve or reject the quantities of materials delivered, equipment erected, and works performed by the Contractor in consultation with MEE/PMU.

A progress chart will be maintained and updated in the Consultants' office. The work progress will be followed by the Consultant especially during the weekly works meetings on sites. Daily and weekly progress update reports and monthly reports will be prepared by the Consultant and forwarded to the MEE/PMU. If there are any urgent issues to notify MEE/PMU immediately.

The Consultant shall be the Employers Representative on site and shall perform all duties delegated by the Employer in writing in accordance with *the MDB's Harmonized Edition of the Conditions of Contract for Construction prepared and copyrighted by the International Federation of Consulting Engineers (Fédération Internationale des Ingénieurs-Conseils, or FIDIC), FIDIC 2010 which is available at www.fidic.org.*

The Consultants will assist in providing information related to the works progress to MEE/PMU when needed.

5. Project Team

The following staff shall be employed in team as detailed below;

#	Post	No
1	Project Manager (Team leader)	1
2	Sewerage / Water / Civil engineer	2
3	Electro-Mechanical Engineer	2
4	Senior Engineer (for each island)	1
5	Field Engineer (for each island)	1

A separate person should be proposed for the position of Senior Engineer and Field Engineer in each of the island specified in the TOR. However, same personnel can be assigned for the position of Project Manager, Sewerage / Water / Civil engineer and Electro-Mechanical Engineer in all the islands.

5.1 Similar Assignments

To be eligible for this assignment, the consultancy firm must demonstrate past experience in performing the services (description of similar assignments, Value of such assignments). The Firm shall have carried out a minimum of Four (4) similar assignments with an average contract value of MVR 1,000,000.00.

5.2 Qualifications of the Design and Consultancy team

The Consultant should submit full CV's for each of the proposed staff members highlighting the criteria given below.

a. Project Manager

Bachelor's degree in Project Management or Environmental Management/Science or in a related field with minimum 10 years' experience in project management, along with specific experience in the field of Sewerage projects. Tertiary certification will be an added advantage.

b. Civil Engineer

Bachelor's degree in Civil/Environmental Engineering with minimum 05 years' experience along with Specific experiences in designing sewerage systems. Tertiary certification will be an added advantage.

c. Electro-Mechanical Engineer

Bachelor's Degree in Electrical/Mechanical Engineering with minimum 05 years' experience along with specific experience in designing Electro-Mechanical components of Water/Sewerage Facilities. Tertiary certification will be an added advantage.

d. Senior Engineer

The Senior Engineer shall have a Bachelor of Engineering or higher with a minimum of 10 years' experience in Construction Site Management and specifically 3 years as a senior project manager working on Sewerage Construction projects. The Senior Engineer should also have demonstrated experience in the use of dewatering techniques for construction in areas with high water tables and an understanding of the difficulties limitations and mitigation methods required to minimise the impacts of dewatering. The Senior Engineer shall be fluent in both written and spoken English with Divehi an advantage.

e. Field Engineer

The technical field Officer shall have a Bachelor of Engineering or similar degree with a minimum of 3 years' experience in Construction Site Management with at least 1 year experience in the construction of sewerage infrastructure projects. The Field Engineer shall be fluent in both written and spoken English with Divehi an advantage.

6. Reporting Requirements

The consultants should submit a Monthly report at the end of each month within 10 working days of the preceding month, in a format agreed with the MEE/PMU representative. At the end of each

quarter a consolidated report summarizing the events of the months preceding shall be submitted in place of the monthly report.

A final report shall be produced 30 days following the issuance of Performance Certificate to the Contractor by the Supervision Consultant to MEE/PMU.

7. Equipment, logistics and facilities

The Consultants shall ensure that experts are adequately supported and equipped. In particular he/she shall ensure that there are sufficient administrative, computing and secretarial provision to enable experts to concentrate on their primary responsibilities. The Consultant shall meet the full costs for the supply of the teams including all travels, remuneration, insurance, emergency medical aid, facilities and all else necessary for the competent operation of their teams. The Consultants will provide their own office space for their Project team.

8. Remuneration

Remuneration will be in accordance with the schedule specified below;

DESCRIPTION	ALLOCATION	REQUIREMENT
Part I Monthly payment	As per invoice	Submission of Monthly Report
		Submission of Invoice in the specified format
Part II Quarterly Payments	As per invoice	Upon submission of quarterly inspection report for defects notification during defects liability period.

9. Deliverables

The consultants shall complete the following deliverables and submit the following reports;

Part I

- Weekly reports
- Monthly reports
- Quarterly reports
- Trainings for relevant staff
- Final report

Part II

- Quarterly inspection reports
- Project Completion Report (PCR)
- Trainings and Operations Manual

10. Technology Transfer

The Consultant shall consider the technology transfer as an important aspect of this project. The Consultant shall provide the opportunity to the staffs of the client to be involved in the working team of Consultants during the work supervision stage of the project for their capacity development wherever possible.

11. Duration of the Assignment

The period of total engagement will be **18 months** upon the signing of the contract agreement with the selected Consultant for the Consultancy for Works Supervision. Commencement of Supervision Consultancy work will start soon after the mobilization of selected Contractor to the site.