Terms of Reference
Constructor to build a Clean Water System
for Kampong Luong Floating Tourism Community

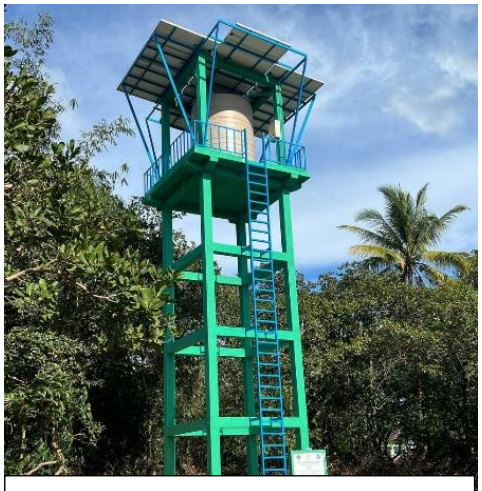
Term of Reference for Construction Work
30 July 2024

1. Background

VSO is part of a consortium leading on Green Economy component of Generating Resilient Environments and Promoting Socio-Economic Development of the East Tonle Sap Lake (GREEN) which is a four-year project co-funded by European Union (EU), commencing from March 2021 – February 2025. This consortium is led by Save the Children who also leads on Education component. Other consortium IDE leads on Water, Sanitation and Hygiene. The project aims to support vulnerable East Tonle Sap fishing communities to improve their socio-economic status and resilience to climate change through better access to clean water supply, hygiene, and sanitation (WASH), green economy initiatives and education.

Under the Green Economy component, VSO is working with relevant stakeholders in the community to promote community-based tourism initiatives intending to enhance tourism attraction site. One initiative is to construct a Clean Water System in Kampong Luong Floating Tourism Community, which is a critical infrastructure component for a floating tourism community like Kampong Luong, addressing issues of water scarcity, waste management, environmental sustainability, public health, and regulatory compliance. In addition, it can help the long-term visibility and success of the floating tourism community.

VSO Cambodia is looking for qualified constructors to submit their proposals for the construction of a Clean Water System for 1,470 families (3,716 people) living at Phum 4, Kampong Luong Floating Tourism Community, which is in Kampong Luong Commune, Krakor District, Pursat Province. The Clean Water System will be located close to the Solar System.



Sample of Clean Water System

Solar System Place

2. Objectives of the construction

Under the supervision of the GREEN Project Manager, the Constructor is responsible for designing, constructing, and commissioning a clean water system that can provide a reliable, sustainable, and safe supply of drinking water for Kampong Luong community. The system should be able to effectively remove contaminants and pathogens from the water source to meet or exceed all relevant water quality standards.

3. Scope, Specification, Deliverables, and Schedules of Assignment

The Constructor will be arranged with two months contract and on the ground, support provided by VSO Cambodia. The Constructor will report to the GREEN Project Manager and Technical Coordinator undertake to deliver and complete the following deliverables within the given period which will commence from 01st September to 15th October 2024. Specifically, the constructor tasks are outlined as follows:

Scope of Work

The scope of work for this project includes the following key elements:

- **Site Assessment and Analysis**:
    - Conduct a comprehensive assessment of the water source, including water quality testing and analysis of the physical, chemical, and biological characteristics. This includes survey for underground water, drill boreholes to take underground water for testing, and take water for sample and testing.
    - Evaluate the current water demand and projected future needs of the community.
    - Identify suitable location(s) for the water treatment plan and related infrastructure.

- **System Design**:
    - Develop a detailed design for the clean water system, including the selection of appropriate treatment technologies, process flow diagrams, and engineering specifications.
    - Ensure the system is scalable and can accommodate future growth in water demand.
    - Incorporate energy-efficient and environmentally sustainable design principles.
    - Obtain all necessary permits and approvals for the construction and operation of the system.

- **Construction and Installation**:
    - Procure all necessary materials, equipment, and labor for the construction of the water treatment plant and related infrastructure. This includes: **1. Raw water pumping station, 2. Pipe network for pumping input and output, 3. Sediment tank system, 4. Drinking water treatment and filter system, and 5. Electrical work connecting from power supply station.**
    - Oversee the construction process to ensure adherence to the design specifications and timeline.
    - Conduct rigorous testing and commissioning of the completed system to verify its performance and functionality.

- **Training and Capacity Building**:
    - Provide comprehensive training to the local community and operations staff on the operation, maintenance, and troubleshooting of the clean water system.
    - Develop a detailed operations and maintenance manual, including standard operating procedures, maintenance schedules, and emergency response protocols.
    - Facilitate knowledge transfer and build the capacity of the local community to independently manage and sustain the system.

- **Monitoring and Evaluation**:
    - Establish a comprehensive monitoring and evaluation plan to assess the system's performance, water quality, and impact on the community.
    - Regular maintenance, monitoring, and system optimization within six months after the completion of a clean water system.

Specification

The clean water system is designed with comprehensive specifications to ensure a reliable, sustainable, and resilient clean water system that can meet the potable water and wastewater treatment needs of the Kampong Luong floating tourism community. The multi-stage filtration and purification process ensures the removal of a wide range of contaminants, meeting the necessary water quality standards.

1. **Water Source and Intake:**
    - Primary water source: Lake/river water
    - Intake system:
        - Floating pontoon-mounted intake structure with submerged intake pipes.
        - Stainless steel screens and mesh to prevent debris and aquatic life from entering the system.
        - Dual submersible intake pumps for redundancy.

2. **Pre-Treatment:**
    - Coarse screening: Mechanically cleaned bar screens to remove large debris and objects.
    - Sedimentation: Lamella clarifier to remove suspended solids and particles.
    - Aeration: Cascade aeration system to remove dissolved gases and adjust pH.

3. **Primary Treatment:**
    - Multimedia Filtration: Multi-layer sand and anthracite filters to remove fine particles.
    - Disinfection: UV disinfection system to inactivate pathogens.
    - Softening (if required): Ion exchange system to remove hardness.

4. **Advanced Treatment (if required):**
    - Reverse Osmosis (RO): High-efficiency RO system to remove dissolved salts, minerals, and organic compounds.
    - Activated Carbon Filtration: Granular activated carbon filters to remove taste, odor, and trace organic compounds.

5. **Treated Water Storage and Distribution:**
    - Treated water storage tanks with a total capacity of 30-40 cub meters daily for 1,470 households (3,716 people) water demand.
    - Pressurized distribution system with variable-speed booster pumps and backup power-operated pumps.
    - Automated control and monitoring system to maintain water quality and pressure.

6. **Wastewater Management:**
    - Wastewater collection and holding tanks.
    - Membrane bioreactor (MBR) system for advanced wastewater treatment.
    - UV disinfection of treated wastewater for discharge or reuse.

7. **Sludge and Residuals Management:**
    - Sludge dewatering system (e.g., belt filter press).
    - Disposal or reuse of dewatered sludge as soil amendment or construction material.

8. **Energy Efficiency and Sustainability:**
    - Rooftop solar photovoltaic system to power the water treatment and distribution system.
    - Energy-efficient equipment (e.g., high-efficiency pumps, LED lighting).
    - Waste heat recovery from the RO system for building heating.

9. **Monitoring and Control:**
    - Continuous water quality monitoring for key parameters (turbidity, pH, chlorine residual, etc.).
    - Supervisory control and data acquisition (SCADA) system for automated control and remote monitoring.

10. **Resilience and Redundancy:**
    - Appropriate backup diesel generator for emergency power.
    - Redundant treatment components (e.g., parallel filters, pumps, disinfection units).
    - Emergency response and disaster preparedness plans.

11. **Safety and Accessibility**
    - The system should be designed to ensure the safety of occupants.
    - Adequate guardrails, handrails, and access systems should be included.

12. **Compliance and Permits**
    - The constructor should obtain all necessary permits and approvals required for the construction.
    - Compliance with local building codes, regulations, and safety standards is mandatory.

Deliverables

The key deliverables for this project include:

No.	Description of Key Deliverables as listed	Expected Completion Date	Duration
1	Comprehensive site assessment and analysis report.	1st September	1 week
2	Detailed system design and engineering specifications for the clean water system, including Procurement and construction documents, including a project timeline and budget.	8th September	1 week
3	Construction and installation of clean water system, including all associated infrastructure.	8th October	1 month
4	Maintenance manual, including training materials and monitoring and evaluation plan.	15th October	1 week

4. Budget & Payment Schedule

As a non-profit organization, VSO Cambodia has a duty to its donors to obtain value for money in all its procurement activity. The budget for this construction work shall be proposed by the constructor including 15% withholding tax. The constructor is requested to submit its best offered budget with cost breakdown (including fee, travel costs, per-diem, lodging cost, and any other costs required) for this construction work. Please also note that other related costs for community engagement, training, exposure/site visits, etc. have no need to be included in your budget proposal.

Payments will be made upon approval of the submitted and completed deliverables in the agreed workplan and the approved deliverables. An invoice and proof of satisfactory completion of the respective agreed deliverables must also be submitted.

Payment Terms:

Deliverable	% of Payment
• Complete comprehensive site assessment and analysis report. • After submitted the detailed system design and engineering specifications for the clean water system, including Procurement and construction documents, including a project timeline and budget	40%
• Completed Construction and installation of clean water system, including all associated infrastructure.	30%
• After submitted the maintenance manual, including training materials and monitoring and evaluation plan.	20%
• Six months after the completion of the Clean Water System for quality and safety assurance.	10%

5. Reporting

It is noted that the constructor is expected to submit progress reports to VSO Cambodia on a monthly basis.

6. Intellectual Property

All information related to all finished products will remain the property of VSO Cambodia. Except for purposes of this assignment, the information will not be disclosed to the public nor used in whatever without written permission from VSO Cambodia.

7. Required Skills and Experience

The successful constructor for this project should have the following qualifications and experience:

- Proven track record in the design, construction, and commissioning of clean water systems for similar communities.
- Expertise in water quality analysis, treatment technology selection, and system optimization.
- Comprehensive understanding of construction principles, techniques, and materials used in.
- Ability to analyze and assess structural integrity, load-bearing capacities, and stability requirements specific to the design and purpose of the clean water system.
- Strong project management skills, including the ability to coordinate multiple stakeholders and manage budgets and schedules.
- Aptitude for identifying and resolving construction-related challenges and obstacles that may arise during the project.
- Experience in capacity building and knowledge transfer to local communities.
- Results-oriented with the ability to deliver high targets and meet deadlines.
- Proactive, responsible and creative.
- Ability to be open minded and respectful.
- Ability to be resilient and adaptive to new situations.

8. Application process:

Interested constructor should submit a proposal to VSO Cambodia by **13th August 2024** to sokkheang.tith@vsoint.org with subject: "**Application for Construction of Clean Water System**". The proposal needs to include:

1. Company profile and relevant experience
2. Proposed approach and methodology for the project
3. Detailed project timeline and budget
4. Key personnel and their qualifications
5. References from previous similar projects

Only shortlisted applicants will be asked to proceed with the next steps.
Should you inquire further information, please contact: Ms. Tith Sokkheang via email: sokkheang.tith@vsoint.org or mobile: 012 398 070.

As the scope of assignment involves personal information, the General Data Protection Regulations (GDPR) are likely to apply to your contract. The process for deciding this involves Privacy Impact Assessment screening. Information on GDPR is available on the GDPR and Data Protection SharePoint page or sent to you.