Request for Expressions of Interest (REOI)
(Consulting Services – Selection of Firms)

Country: Cambodia
Client: The Ministry of Water Resources and Meteorology (MOWRAM)
Project: Integrated Water Resources Management Project (IWRM) 55197-001
Grant No.: PPSF
Contract/Assignment Title: Advanced Works DED and Contract Preparation
REOI Reference No: *IWRM-Category 1-Contract No. 1*

1. The Government of Cambodia (GoC) has applied for financing from the Asian Development Bank and co-financing from the Asian Infrastructure Investment Bank (AIIB) toward the cost of the Integrated Water Resources Management Project (IWRM). and intends to apply part of the proceeds for consulting services. A grant for project preparation was approved in September 2022 from AIIB's Project Preparation Special Fund (PPSF), which financial assistance portion of the grant is implemented by the Ministry of Water Resources and Meteorology (MOWRAM), Implementing Entity (IE) of the Project.

   The consulting services ("the Services") include the preparation of the Detailed Engineering Design (DED) and tender package for Advanced Works of the IWRM project. The works are located in the Pursat Province concerning the irrigation and the civil engineering work has an estimated total at $13.9 million, in sufficient detail to meet the requirements for ADB and AIIB financing, and the requirements of the GoC and MOWRAM to execute the advanced works. The PMIC consultant will be responsible for the contract management and site supervision.

   It is estimated that 20.5 person months of International Experts and 49 person months of National experts, and in addition administrative and CAD support over 10-month period, with expected start date of the assignment in first quarter of 2024.

   The Detailed Terms of Reference (TOR) for the assignment are attached to this Request for Expressions of Interest.

2. The MOWRAM now invites eligible consulting firms ("Consultants") to indicate their interest in providing the Services. Interested Consultants should provide information demonstrating that they have the required qualifications and relevant experience to perform the Services. The shortlisting criteria are:

   (i) Core business experience in water resources, irrigation and flood management including engineering design services documented with at least one (1) Detailed Engineering Design ***each*** for: a) large scale irrigation, b) flood management, and c) drainage systems within the last 10 years.

   (ii) Demonstrated experience working in Southeast Asia and with government or private sector clients, with one (1) Technical study/DED/PMC contract implemented in the last 10 years.

   (iii) Demonstrated experience working with multilateral development banks, with at least one (1) contract completed in the last 10 years.

   Key Experts will not be evaluated at the shortlisting stage.

3. The attention of interested Consultants is drawn to Section II, paragraphs 4.4, 4.4.2 and 13.4 of the Bank's "Interim Operational Directive on Procurement Instructions for Recipients" dated June 2, 2016, ("Procurement Instructions"), setting forth the Bank's policy on conflict of interest.

4. Consultants may associate with other firms to enhance their qualifications but should indicate clearly whether the association is in the form of a joint venture and/or a sub-consultancy. In the case of a joint venture, all the partners in the joint venture shall be jointly and severally liable for the entire contract, if selected.

5. A Consultant will be selected in accordance with the Quality and Cost-Based Selection (QCBS) method set out in the Procurement Instructions.

6. Further information can be obtained at the address below during office hours.

7. Expressions of interest must be delivered in a written form to the address below (in person, or by mail, or by fax, or by e-mail) by ***9 January 2024 on*** **or before 17:00 hours (local time)**

Ministry of Water Resources and Meteorology (MOWRAM)

Mr.IM Soursdey, AIIB Project Manager

#364 Preah Monivong Blvd, Sangkat Phsar Daerm Thkov, Khan Chamkarmorn, Phnom Penh, Cambodia, 120112- Phsar Daerm Thkov-Phnom Penh, Cambodia

Email:suasdeyim@yahoo.com, and copy to

Mr. Sok Boren, Procurement Officer, Email: sokboren83@gmail.com.

The Royal Government of Cambodia

Ministry of Water Resources and Meteorology (MOWRAM)

TA-9681 REG: CAM: Integrated Water Resources Management Project (50266-001)

Terms of Reference (TOR) For Detailed Engineering Design (DED) and tender packages for Advanced Works concerning Kbal Hong Irrigation System in Pursat Province

Reference No: *IWRM-Category 1-Contract No. 1*

1. Project Background

The Ministry of Water Resources and Meteorology (MOWRAM) is preparing an Integrated Water Resources Management Project (IWRM Project) to be co-financed by Asian Development Bank (ADB) and Asian Infrastructure Investment Bank (AIIB). The IWRMP will support the strengthening of the integrated water resources management (IWRM) to foster socioeconomic development in the project area in the river basin group covering rivers Pursat, Svay Daun Keo, Moung Russei, Sangker which are located in the southwest of the Tonle Sap Great Lake (TSL). The project will be aligned to impact: Cambodia's Water Resources Management (WRM) to adapt to the changing climate in sustainable ways to support social and economic growth whilst protecting the environment and enhancing ecosystems in the river basin group covering Pursat, Svay Daunkeo, Moung Russei[1]. The farmers of this river basin group were assessed as some of the most vulnerable due to the limited available water reduced at critical times due to climate change impacts combining with anthropogenic impact of development in upstream countries reducing the flood pulse of the Tonle Sap Lake.

The project is expected to have the following outcome: livelihoods in the target river basin group made climate and disaster resilient through climate adaptive IWRM.

1.1. Output

To achieve the objectives set out above, the following outputs are to be produced:

Output 1: Planning, coordination, and climate change adaptation capacities of water resources management strengthened. The project will help provinces establish effective river basin committees (RBMCs) to develop and implement: (i) effective and climate-adaptive river basin management plans, (ii) climate-adaptive multiple reservoir integrated operation plans to optimize the benefits from water release; and (iii) river flow management plans with water allocation rules. These plans will be developed in consultation with key water user stakeholders. Furthermore, it will: (i) support the upgrading of existing, and installation of additional, hydrometeorological and groundwater monitoring stations with remote monitoring and data transmission systems; and (ii) develop and operate drought and flood forecasting and warning systems with drought and flood risk maps. This output also includes providing important training

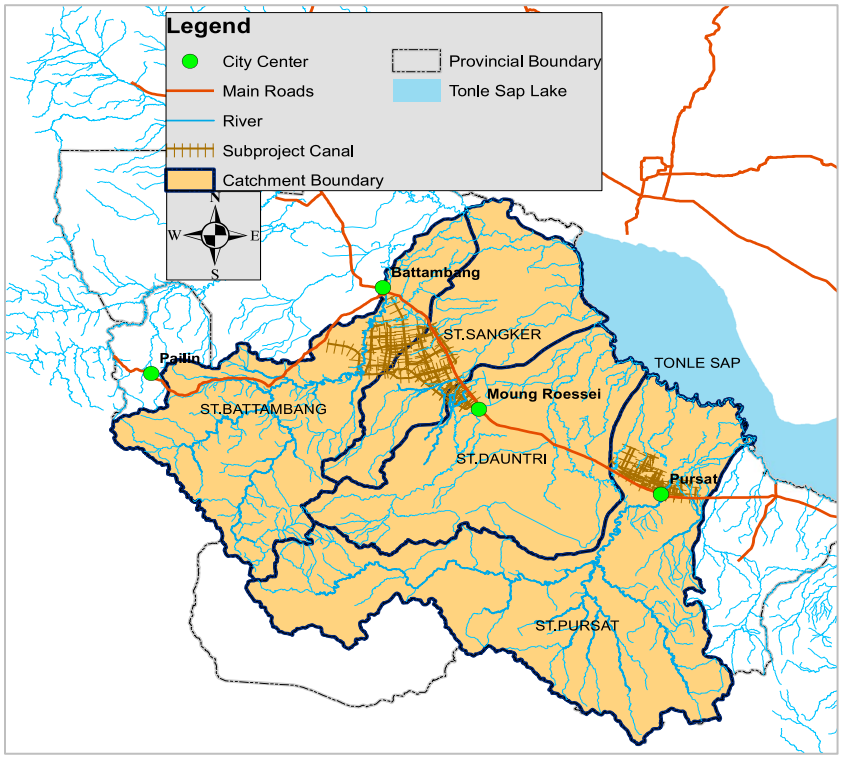
[1] Beneficiaries are within Pursat and Battambang Provinces.

to RBMCs to increase their climate-adaptive water resource management capacities and enable them to effectively undertake all their functions.

Output 2: Available water during dry season increased. The project will prepare investment packages (to feasibility study stage) to: (i) construct and/or upgrade existing off-river storages for dry season cropping; (ii) construct and/or upgrade irrigation systems to extend irrigated service areas; (iii) install fish passages in existing and new river and/or canal crossing structures for fish friendly river management; and (iv) remodel existing irrigation weirs for stable water intake for domestic water supply. Capacity development support will be provided to strengthen participatory irrigation management by training irrigation farmers to: (i) form and/or continue to strengthen farmer water user communities for efficient water use and sustainable operation and maintenance (O&M) of the on-farm irrigation canals; (ii) crop non-paddy rice and manage their farming; and (iii) demonstrate the alternate wetting and drying method to grow paddy rice to reduce the methane emissions and increase crop yield.

Output 3: Flood risk during wet season reduced. Under this output, the project will: (i) recommend measures to remodel existing reservoirs and/or improve existing reservoir operation to increase flood protection capacities; (ii) introduce flood risk mitigation interventions (such as flood dike strengthening, ring levees, and drainage improvements) using nature-based solutions to the extent feasible; and (iii) develop flood risk maps and operate gender-responsive community flood preparedness plans. The main irrigation canals to be constructed and/or upgraded (under Output 2 will be linked to adjacent rivers and/or off-river storage to divert flood water to maximize the benefits of flood water and minimize flood damage downstream of the river where the water is withdrawn).

Figure 1. Project Target River Bains and Location



Source: TRTA Team, 2023

1.2. Project Implementation Arrangement

The Ministry of Water Resources and Meteorology (MOWRAM) is the Executive Agency (EA), and the Project Management Unit for ADB, EIB and AIIB finance (PMU-ADB EIB and AIIB MOWRAM) will be responsible for the implementation of the project. Provincial Administration for the two provinces—Pursat and Battambang will be the coordinators for the implementation.

MOWRAM intends to appoint a Consultant for Preparation of the Advanced Action Works (this assignment) as well as a Project Implementation Consultant (PIC) who will oversee the Design and implementation of the full project.

The process and requirements for the recruitment of the DED consulting services will follow AIIB's procurement policy and regulations while the process and requirements for the bidding of the associated works resulting from the DED will follow ADB's procurement policy and regulations.

2. Purpose of the Assignment

MOWRAM is looking for a qualified consulting firm to conduct (i). Detailed Engineering design of the Advanced Action works for selected irrigation and flood control infrastructure for the Kbal Hong Irrigation Subproject in Pursat Province. The two Main Canal systems cover a command area of 11,051ha on left and right of the Kbal Hong River Regulator sited in the urban provincial capital Pursat town. The selected consultant firm will be working with the PIC (when mobilized) under the supervision of the MOWRAM Project Management Unit. The specific scope of consultant services is given in the next section of this TOR.

3. Objective and Scope of Advanced Works Service

The objective of this assignment is the preparation of the **Advanced Works Detailed Engineering Design** and associated tender packages required for international tendering for specific items including the Kbal Hong Regulator. Engineering reports detailing the design process and findings will be produced in draft and finalised after comment coordinated by the PMU. A full package of contract documents suitable for tendering will be required. The Project Implementation Consultant (PIC) will also be recruited for implementation of the full loan package including DED of canals and other works not included in the Advance Action DED service described here. The two consultants must work closely under the guidance of the MOWRAM Project Director and Project Management Unit (PMU).

The advanced works will comprise:

a) A new Regulator/Barrage on the Pursat River (90-110m width) downstream of the current Kbal Hong weir site in Pursat town together with associated gates, fish passage, electrical and mechanical works, control house and public road bridge crossing. Construction is envisaged in two phases within the river bed with a part cofferdam to protect the working area of around half the river width. The cofferdam may be removed during the rainy season to avoid flooding of the town. Note that the consultant is expected to produce functional specifications for gates, lifting gear, mechanical, electrical and control systems.

b) Intake works at two main canal offtakes. These are designed to allow for future expansion to support irrigation areas beyond the Kbal Hong and the higher river regulation level than the existing weir.

It is envisaged that certain additional works could be added to the DED Advanced Works consultancy through a Variation Order if proven feasible in the ongoing TRTA studies under ADB TRTA 9681. These could include various flood works including a siphon for the Kbal Hong MC 1 at the Svay Ath river crossing, siphon/culverts with access roads on MC1 and MC2, a new flood offtake structure from the Pursat River for a linking channel to the Svay Ath river to improve flood conveyance as listed in Table 1. It could also include a pump station on MC2 to supply high elevation area of 963 Ha.

The cost of the Advanced Works is estimated at $22.4 million including the mechanical, electrical and control system. It is proposed to use 20m wide gates that allow for more rapid construction of a reduced number of piers and reduced impact on high flows. The DED will specify associated control systems and backup power supplies to ensure high reliability in operation. The construction period is envisaged as 3 years for the new Kbal Hong regulator, and supervision will be by the Project Implementation Consultant (PIC). Meanwhile, the duration of this DED consultancy services will be 10 months.

Feasibility level designs will be available from the TRTA Consultants including CAD drawings (Attachment 1). The feasibility level study design for Kbal Hong regulator indicates a gated structure with 3 No 20m 4.5m high gates and 2 no 12.5m gates, two fish pass, associated automated lifting and control gear, backup power generation and telemetry control room. As the regulator is to be built within the urban area of Pursat, special attention is required to ensure no increase in flood risk during construction or operation.

The architecture of the works should be in keeping with the town development as a leading Provincial centre on the Pursat River with close vicinity of the Caraman mountain and the Tonle Sap Lake. The regulator structure should incorporate a road bridge crossing designed for use by the public for local access across the river and also to serve as the access bridge to the gate control mechanisms and for waterway maintenance.

The regulator location and intake gate structures are expected to be selected to minimise the resettlement and land acquisition requirements, but these must be further considered under the Basic Resettlement Plan already being developed with the Cambodia General Department of Resettlement (GDR) and under the updated resettlement plan to be prepared and finalized by the GDR with the supports of the DED consultant. However, if the recruitment of the PIC fell at the same time as that of the DED for Advanced Works, the PIC consultant will take over the resettlement and land acquisition requirements.

Geotechnical, bathymetric and topographic data collected at feasibility study level will be made available and there will be further budget ($50,000) for additional survey to be determined by the consultants and procured through the MOWRAM Project Management Unit.

4. Location of Advanced Works

Kbal Hong Irrigation Subproject comprises of a River Cross Regulator on the Pursat River in Pursat town (12°32'51.94"N, 103°55'19.06"E) and two separated irrigation command areas on the left and right bank of the Pursat River. MC1 on the left bank is approximately 70m upstream of the existing weir and MC2 on the right bank is some 1.5km upstream. The two main canals MC1 and MC2 serve 9,311 ha and 1,740 ha of command area respectively. The new regulator will be sited about 200m downstream of the existing weir with the exact location to be determined during detailed design.

The existing weir in Pursat Town was built in place of the previous gated regulator for Kbal Hong which was removed in 2018. The weir serves the purpose of maintaining the water levels for abstraction for water supplies and stability of the banks. The weir has a successful fish pass that will need to be replicated in the new design of the Kbal Hong regulator. To work closely with the other parties involved it is expected that the full team will be mobilised to work as required in the MOWRAM Office in Phnom Penh with frequent visits to liaise on site in Pursat.

Table 1. List of villages, communes, and districts under the coverage of Kbal Hong Irrigation Subproject.

Subproject Component/System	Potential Command Area [Ha]	Commune	District
Kbal Hong River Cross Regulator			
MC1 main canal system	9,311	1. Pteah Prey (9 villages)	Pursat City
		2. Koh Chum (8 village)	Kandieng
		3. Snam Preah (13 villages)	Bakan
		4. Trapeang Chorng (7 villages)	Bakan
		5. Boeng Bat Kandorl (7 villages)	Bakan
MC2 main canal system	1,740	6. Prey Nhy (5 Villages)	Pursat city
		7. Banteay Dey (12 Villages)	
		8. Veal (9 villages)	Kandieng
		9. Anlong Vil (10 Villages)	
Total	11,051 Ha	9 Communes (80 Villages)	3 Districts

Source: IWRM TRTA Consultant, 2023.

5. Data and Deliverables

The firm submitting proposals shall review the TRTA Inception Report, Mid Term Progress Report, Feasibility Study for Kbal Hong and other relevant reports available including descriptions of survey data and geotechnical information already available.

Expected outputs from the firm are list in Table 2.

Table 2. List of Expected Outputs

No.	Expected output/deliverable	Indicative Delivery Date (weeks)	
		Draft	Final
	Inception Report	4	6
D01	Detailed topographical/bathymetric and geotechnical survey for areas of work including the Kbal Hong Regulator, bridge and Control House.	8	10

D02	Additional Hydrological Design Report for Pursat River, including the peak flood estimation for Kbal Hong River Regulator design	4	8
D03	Hydraulic Design of the Kbal Hong River Regulator and associated structures, fish pass, bank protection etc	12	16
D04	Hydraulic design of canal intake works, and any other structures identified for advance works	16	20
D05	Structural Design/Analysis, Electrical and Mechanical Design of Kbal Hong River Regulator	20	24
D06	Technical Drawings (Architectural, Structural Electrical and Mechanical Design Drawings of Kbal Hong River Regulator	24	28
D07	Technical Specification for the construction of Kbal Hong Regulators and associated facilities (gates, mechanical and electrical system, erosion projection works, safety measures, etc.)	24	28
D08	Tender Package including Bill of Quantity and Engineering Cost Estimate for Kbal Hong River Regulator and canal intakes	28	32
D09	Tender Packages including Specification, Bill of quantities and engineering cost estimate for other works agreed (if any)	30	36
D10	Final Report	36	40

Deliverable. On top of the deliverable listed above, the firm shall also submit all the deliverable to the MOWRAM:

i. Inception Report, by week 4 after the contract signed.
ii. Mid-term report, by Week 24 after the contract signed.
iii. Final report, by the Week 40 after the contract signed, and
iv. Monthly progress report, at the end of each month

Contract Amount. The contract will be a lump-sum based. The payment schedule is based on the deliverable submitted and subject for approval from MOWRAM as below:

Payment Number	Deliverable	Percentage	Remarks
Payment No.1	Mobilisation	10% of total contract amount	
Payment No.2	1. Inception Report 2. Deliverable D01 3. Deliverable D02	20% of total contract amount	
Payment No.3	1. Deliverable D03 2. Deliverable D04 3. Deliverable D05	20% of total contract amount	

Payment Number	Deliverable	Percentage	Remarks
Payment No.4	1. Mid-term report 2. Deliverable D06 3. Deliverable D07	20% of total contract amount	
Payment No.5	1. Deliverable D08	20%	
	1. Deliverable D09	As Agreed in any VO	
Final Payment (No.6)	1. Deliverable D10 2. Final Report	10% of total contract amount	

Types of consultant selection. A qualified international or a qualified national consulting firm will be selected using the quality- and cost-based selection (QCBS) procedure at 80:20 ratio and full technical proposals, following the Procurement Manual/Standard Operating Procedures (SOP) on externally funded project of the Royal Government of Cambodia and the AIIB's Interim Directive on Procurement Instructions for Recipients. The consulting services will be implemented for a period of 10 months (January to October2024)

Coordination with other consultants. The firm will be required to coordinate with the TRTA Consultant Team (NIRAS) which is currently on-board, and contracted by ADB to initially support MOWRAM in the preparation of the project to ensure that the design of the selected irrigation subproject—Kbal Hong irrigation system will be designed correctly and in compliance with the MOWRAM and ADB recommendation. The Project Implementation Consultant (PIC) will take over this role when appointed and continue to implement the full IWRM project.

6. Qualification and Team Composition

Consultant's qualifications, proposals, and detailed terms of references. The firm should provide information demonstrating that they have the required qualifications and relevant experience to perform the Services. The shortlisting criteria are:

(i) Core business experience in water resources, irrigation and flood management including engineering design services documented with at least one (1) Detailed Engineering Design ***each*** for: a) large scale irrigation, b) flood management, and c) drainage systems within the last 10 years.

(ii) Demonstrated experience working in Southeast Asia and with government or private sector clients, with one (1) Technical study/DED/PMC contract implemented in the last 10 years.

(iii) Demonstrated experience working with multilateral development banks, with at least one (1) contract completed in the last 10 years.

The minimum requirements of the consulting services input of "Key" and "non-key" experts are in **Error! Reference source not found.**. Besides, the firm will need to be working closely with consultant under the ADB finance package TRTA, and individual environmental safeguard specialists (national and international) and social safeguards consultants (national and international) recruited directly by ADB to ensure the design of the infrastructures complies with requirement of the MOWRAM as well as the requirement from the ADB.

On top of minimum requirements for the consultant inputs listed in **Error! Reference source not found.**, the firm shall mobilize a qualified topographical and geotechnical survey team and adequate survey equipment including DGPS, Eco-sound system, and drone to perform the

whatever additional detailed topographical survey is required for completing the design of the infrastructure. The cost for topographical survey work is lumped into the overall contract cost. Further Survey for the detailed resettlement plan and Inventory of Loss will be procured through the PMU under separate budget.

Table 3 Minimum Requirements for Consulting Service Inputs, Key Experts

ADB TA 9681-REG-CAM: IWRM Project PPSF (AIIB) grant element for Advanced Works DED						
	Description/Position	No	INT/NAT	Pers Months		Total Person-month
				HO	FW	
I. REMUNERATION						
A.	INTERNATIONAL KEY EXPERTS					
	Team Leader- Engineer Hydraulic Structures	1	int		6	6
	Hydraulic/Structural Design Engineer	1	int		6	6
	Electrical/Control System Engineer	1	int		1	1
	Mechanical Engineer	1	int		1	1
	Social Safeguard/ Resettlement Specialist	1	int		1	1
	Procurement/Contract Specialist	1	int		2	2
	Hydrologist/ Geomorphologist/ Modeller	1	int		2	2
	Fish Passage Expert	1	int		0.5	0.5
	Environment Specialist	1	int		1	1
	SUBTOTAL KEY International					20.5
B.	NATIONAL KEY EXPERTS					
	Deputy Team Leader- Irrigation and Drainage Design Engineer	1	nat	10		10
	Hydraulic/Structural Design Engineer (2 Persons)	2	nat	6		12
	Bridge Design Engineer	1	nat	3		3
	Electrical/Control System Engineer	1	nat	4		4
	Mechanical Engineers	1	nat	3		3
	Social Safeguard/ Resettlement Specialist	1	nat	4		4
	Procurement/Contract Specialist	1	nat	4		4
	Hydrologist/ Geomorphologist/ Modeller	1	nat	4		4
	Cost Engineer/ Pricing Expert	1	nat	3		3
	Environment Specialist	1	nat	2		2
	SUBTOTAL National Key Expert					49
	Total Key Staff Input					69.5

The TOR and required qualification for each specialist is provided in paragraphs below. The proposing entity is required to provide both key and non-key experts listed in Table 3. These experts must be included in the personnel work plan and schedule, and in the financial proposal, in accordance with the proposed approach and methodology. One CV must be submitted for each key expert included in the proposal. The CVs of the key experts will be scored as part of the technical evaluation of proposals. The proposing entity can propose that one key expert serves multiple positions, including other key expert and non-key expert positions, subject to its proposed personnel work plan and schedule. Note that all positions under the contract must be included and budgeted in the financial proposal in accordance with the person-month allocation required for each, as determined by the proposing entity.

Team leader/deputy team leader (international: 6.0 PMs, national; 10.0 PMs). The specialists will, as the team and deputy leaders, provide overall direction and manage DED and relationships with MOWRAM, other relevant ministries, provincial governments, ADB, AIIB and other stakeholders, to ensure effective coordination and synergies between all concerned including MOWRAM's other consultants for the project. He/she will be overall responsible for preparing the projects' outputs, manage all experts' inputs, activities, and outputs, and ensure the consistencies between project outputs, and the quality of the system wide planning exercises, feasibility studies and other reports. He/she will also:
(i) ensure compliance of project outputs with ADB and AIIB guidelines;
(ii) manage the entire DED team, and ensure that all consultants will work closely with each other so that all individual outputs are well integrated and complement each other to ensure quality of the DED and relevant documentation for tendering.
(iii) review all aspects of implementation and construction to identify constraints, bottlenecks, concerns, and synergies; and
(vi) ensure timely delivery of DED and tender package outputs, and of other outputs, in accordance with contract requirements.

He/she will, with other specialists of the team, prepare TORs and cost estimates for (a) surveys, studies and special designs required for DED. Based on the TORs and cost estimates, consultants, or suppliers to be financed by the AIIB PPSF will be selected by MOWRAM and contracts will be signed and administered by MOWRAM. Indicative surveys, studies, special designs will include but not limited to the following: geotechnical and soil tests; ecological, fish, and other aquatic animal surveys; topographic survey(s); resettlement enumeration(s); assessment(s) with associated discussions (e.g., focused group discussions) of the distribution of project effects and the impact on poverty reduction and inclusive growth; updating the gender action plan(s), project administration manual, procurement packaging, tender specifications etc.

Qualifications. The team leader will be expert in design of hydraulic structures and water resources specialists (team leader and deputy team leader) shall have a master's degree or higher in WRM and FRM, civil engineering, or a related subject. He/she should have at least 15 years (10 years for national position) of work experience in both IWRM and hydraulic structure design and construction water use and flood risk management (FRM) projects. He/she should have experience as team leader (as deputy team leader for national position) in at least two project preparatory services or similar activities for both IWRM and FRM projects in Southeast Asia countries.

Hydraulic Structures Design Engineers (international: 6.0 PMs, national; 12.0 PMs).
It is envisaged that 1 International and 2 National Design Engineers will be required covering the full range of civil engineering design and contract preparation for major structures such as the Kbal Hong Regulator and associated structures. Ensuring stability and suitability of the final design under all conditions will be established during the detailed design process.

Qualifications:
Professional civil and structural engineer with bachelor's degree in civil engineering and preferably 10 years' experience (international) and 5 years' experience (national expert) in designing hydraulic structures, preparing tender documents, BOQ, specifications and tender drawings is required.

Bridge Design Engineer (National 3 PM)

The national bridge designer is expected to have full local knowledge on highway requirements structural design and construction of river crossings.

Qualifications:
Professional civil /structural engineer with bachelor's degree in civil engineering and having at least 5 years' experience designing bridge or box culverts and similar structures.

Electrical/Control System Engineers (international: 1.0 PMs, national; 4.0 PMs).
The electrical/control system engineers must derive a full functional specification for the requirements of lifting mechanisms, electrical supplies, back-up generators and control systems. The relevant information on electrical and mechanical systems must also be supplied for the civil works designers to ensure eventual compatibility of all systems.

Qualifications:
Professional electrical/control system engineer with bachelor's degree in electrical/control systems engineering and having at least 8 years' experience (5 years' experience for national) in preparing concept designs and functional specifications for irrigation or water supply appurtenances, lifting mechanisms, electrical supplies, back-up generators and control systems.

Mechanical Engineers (international: 1.0 PMs, national; 3.0 PMs).
The mechanical engineers must derive a full functional specification for the requirements of design of gates, and lifting mechanisms and work with the electrical/control systems engineers for the requirement on electrical supplies, back-up generators and control systems. The relevant information on electrical and mechanical systems must also be supplied for the civil works designers to ensure eventual compatibility of all systems.

Qualifications:
Professional mechanical engineer with bachelor's degree in mechanical engineering and having at least 8 years' experience (5 years' experience for national) in preparing concept designs and functional specifications for irrigation or water supply appurtenances such as gates, lifting mechanisms and control systems.

Hydrologist (international: 2.0 PMs, national; 4.0 PMs).
Working closely with the Team Leader and design engineers during the detailed design stage the hydrologist shall review hydrologic data and documentation, measure and check the adequacy of the existing hydraulic facilities with respect to their position, alignment and capacity, conditions during construction to ensure any deficiencies of the feasibility are rectified in the detailed design. Consideration of flood forecasting during the works implementation is required as well as the longer-term conditions including climate change impact and impact of local development on flood behaviour.

Qualifications:
A qualified hydrologist with masters' degree (international) and preferably 8 years of experience together with National Expert (minimum bachelor's degree) and must be competent in estimating annual flow availability as well as extreme flood events.

Fish Passage Expert (International 0.5 PM)
It is envisaged that the Expert will check the proposed design of fish passage proposed at feasibility and advise on changes required and enhancements at the associated structures such as intakes and flood siphons.

Qualifications:
Bachelor of Science or graduate degree in biology, ecology, ecological restoration, fish and/or wildlife science, environmental studies, or closely aligned field. Knowledge of fish passage barrier correction standards and rules and preferably with experience in Southeast Asia/Cambodia for similar fish passages projects.

Resettlement Specialist (international: 1.0 PMs, national; 4.0 PMs)
International and national resettlement specialists will be required to assist the GDR-MEF in updating the basic resettlement plan, revising cost of resettlement, execution of resettlement plans (BRP) and development of DRP with the GDR, and monitoring of resettlement activities during constructions with guidance from the resettlement specialist in PIC. The specialist will have experience of preferably one ADB financed project and fully aware of ADB's SPS 2009, specific tasks include:
(i) Preparation of resettlement plans for identified sub-projects and in particular ensure timely submission of these to the Inter-ministerial Resettlement Committee (IRC)
(ii) Monitor and report on the progress of the RPs and their implementation
(iii) Assist with the preparation of the right of way (ROW) or reservation width alignments drawings
(iv) Ensure that a claim mechanism is in place whereby affected persons (AP) may have their claims registered
(v) Assist with land holding mapping and registration of ownership data as necessary

Qualifications:
Master's degree in social science/ management or relevant field for the international and bachelor's degree for the national expert. Preferably with 8 years' experience (5 years' experience for national) as Resettlement Specialist dealing with similar projects (with at least 2 projects preferably funded by Development Partners such as ADB, WB, etc,)

Procurement specialist (international: 2.0 PMs, national; 4.0 PMs)
The specialist should be fully familiar with AIIB and ADB's procurement guideline for works contracts. The specialist will work closely with the Team Leader and with the PMU and in particular with the MOWRAM Procurement Officer and with the Procurement Review committee. The activities include but are not limited to:
(i) Prepare draft and final bidding documents for ICB and NCB contracts following ADB's procurement policy and regulations
(ii) Provide advice to PMU for evaluation of bids and preparation of bid evaluation reports

Qualifications:
Bachelor's degree in engineering or other relevant degree and 5 years of procurement experience particularly experience of three (3) ADB financed project is required.

Environment Specialist (international: 1.0 PMs, national; 2.0 PMs)
The environment specialist will:
(i) Revise the IEE and prepare EMPs for each contract according to ADB's SPS 2009.
(ii) Advise on Monitor implementation of EMPs

Qualifications:
Master's degree in environment with preferably 8 years of experience in carrying out EIA, IEE and preparing environment management plans (EMP). Experience of preferably two (2) ADB projects is required.

Costing Expert (national; 3.0 PMs)

The national costing expert will update the feasibility level cost estimates ready for approval and setting budgets for the procurement process.

Qualifications:
Bachelor's Degree in engineering with 5 years' experience in preparing bill of quantities, unit price analysis and cost estimates.