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**REQUEST FOR QUOTATION (RFQ)  
AND  
GENERAL INSTRUCTION TO CONTRACTORS (GIC)**

To : Contractor(s)

Project : *Proposed drilling of borehole Oyere boma Torit West County*

Ref. No.: *IHO/PU/SSHF/8238/015*

Date : 01/06/2018

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The Impact Health Organization (IHO) is a nongovernmental organization established in 2013 and is committed to the principle that saving lives in South Sudan

In the framework of *Proposed drilling of Oyere Borehole*

IHO invites interested eligible Contractors to submit Quotations for the implementation of the listed items below:

<b>Item No.</b>	<b>Item Description</b>	<b>Quantity</b>	<b>Unit</b>
1	Borehole drilling	1	Item

With this RFQ is the GIC which includes Instructions to Contractors, Technical Specifications and administrative requirements that Contractors will need to follow in order to prepare and submit their quotation for consideration by IHO

IHO reserves the right to accept or reject any quotations, and to cancel the procurement process and reject all quotations at any time prior to award of Purchase Order or Contract, without thereby incurring any liability to the affected Contractor/s or any obligation to inform the affected Contractor/s of the ground for the IHO's action.

Very truly yours,

*IHO South Sudan Procurement*

Procurement Staff/Focal Point

IHO is encouraging companies to use recycled materials or materials coming from sustainable resources or produced using a technology that has lower ecological footprints.

# GENERAL INSTRUCTION TO CONTRACTORS (GIC)

## 1. Description of Works

IHO request prospective Contractors to submit quotation for the implementation of *Proposed drilling of Oyere borehole.*

### **Corrupt, Fraudulent and Coercive Practices**

IHO requires that all IHO Staff, contractors, manufacturers, suppliers or distributors, observe the highest stand of ethics during the procurement and execution of all contracts. IHO shall reject any proposal put forward by contractors, or where applicable terminate their contract, if it is determined that they have engaged in corrupt, fraudulent, collusive or coercive practices. In pursuance of this policy, IHO defines for purposes of this paragraph the terms set forth below as follows:

- Corrupt practice means the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence the action of the Procuring/Contracting Entity in the procurement process or in contract execution;
- Fraudulent practice is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, the Procuring/Contracting Entity in the procurement process or the execution of a contract, to obtain a financial gain or other benefit to avoid an obligation;
- Collusive practice is an undisclosed arrangement between two or more contractors designed to artificially alter the results of the tender procedure to obtain a financial gain or other benefit;
- Coercive practice is impairing or harming, or threatening to impair or harm, directly or indirectly, any participant in the tender process to influence improperly its activities in a procurement process, or affect the execution of a contract

## 3. Conflict of Interest

A contractor found to have a conflicting interest to another contractor or in relation with the Procurement Entity shall be disqualified from participating in a tender. A contractor may be considered to have conflicting interest under any of the circumstances set forth below:

- A Contractor has controlling shareholders in common with another contractor;
- A Contractor receives or has received any direct or indirect subsidy from another Contractor;
- A Contractor has the same representative as that of another Contractor for purpose of this quotation;

- A Contractor has a relationship, directly or through their parties, that puts them in a position to have access to information about or influence on the Quotation of another or influence the decision of the Mission/procuring Entity regarding this Quotation process;
- A Contractor who participated as a consultant in the preparation of the design or technical specifications of the Goods and related services that are subject of the quotation.

#### **4. Eligible Contractor**

Only Contractors that are determined eligible shall be considered for award. The Contractor shall fill up and submit the standard IHO Vendor Information Sheet (VIS) (Annex C) to establish the Contractor's eligibility together with the Quotation. To qualify for award of the Contract, bidders shall meet the following minimum qualifying criteria

- (a) Annual volume of construction work of at least *30,000USD*
- (b) experience as prime contractor in the construction of at least *2* works of a nature and complexity equivalent to the Works over the last *2* years, to comply with this requirement, cost of works cited should be at least equivalent to *100%* of the estimated project cost and should be at least 70 percent complete;
- (c) Proposals for the timely acquisition (own, lease, hire, etc.) of the essential equipment listed in the Qualification Information;
- (d) A Contract Manager with *2-3* years' experience in works of an equivalent nature and volume, including no less than three years as Manager; and

#### **5. Cost of Quotation Preparation**

The Contractor shall bear all costs associated with the preparation and submission of his Quotation and IHO will not in any case be responsible and liable for the cost incurred.

#### **6. Errors, omissions, inaccuracies, variations and clarification in the Quotation Documents**

The documents and forms requested for the purpose of soliciting Quotations shall form part of the Contract; hence care should be taken in completing these documents.

Contractors shall not be entitled to base any claims on errors, omissions, or inaccuracies made in the Quotation Documents. Contractors requiring any clarifications on the content of this document may notify the IHO in writing to the following email address. [procure@ihosavinglives.org](mailto:procure@ihosavinglives.org)

IHO will respond to any request for clarification received on or before *5/06/2018*. Copies of the response including description of the clarification will be given to all Contractors who received this General Instruction, without identifying the source of the inquiry.

## **7. Confidentiality and Non-Disclosure**

All information given in writing to or verbally shared with the Contractor in connection with this General Instruction is to be treated as strictly confidential. The Contractor shall not share or invoke such information to any third party without the prior written approval of IHO. This obligation shall continue after the procurement process has been completed whether or not the Contractor is successful.

## **8. IHO's Right to Accept any Quotation and to Reject any and all Quotations**

IHO reserves the right to accept or reject any Quotation, and to cancel the procurement process and reject all quotations submitted, at any time prior to award of contract, without thereby incurring any liability to the affected Contractor or Contractors or any obligation to inform the affected Contractor or Contractors of the ground for the IHO's action.

## **9. Requirements**

### **9.1 Quotation Documents**

The following shall constitute the Quotation Documents to be submitted by the Contractors:

- 1.) Quotation Form (Annex A)
- 2.) Bill of Quantities Form (Annex B)
- 3.) Vendor Information Sheet Form (Annex C)
- 4.) Construction Schedule Form (Annex D)
- 5.) Key Supervisory Staff Schedule Form (Annex E)
- 6.) Equipment Schedule Form (Annex F)
- 7.) Plans and Specifications (Annex G)
- 8.) Bid Security<sup>1</sup> (Annex H)
- 10.) Pro forma Contract <sup>2</sup>(Annex I)

Contractors are required to use the forms provided as Annexes in this document.

### **9.2 Quotation Form**

The Quotation Form (Annex A) and other required documents shall be duly signed and accomplished and typewritten or written in indelible ink. Any correction made to

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<sup>1</sup> If applicable. The Security is to protect IHO against the risk of Contractors conduct especially for high value and complex scope of works

<sup>2</sup> If applicable. In lieu of P.O.

the prices, rates or to any other information shall be rewritten in indelible ink and initialed by the person signing the Quotation Form.

The language of the Quotations shall be in English and prices shall be quoted in *United States Dollars (USD)*, exclusive of VAT.

Prices quoted by the Contractor shall be fixed during the Contractor's performance of the contract and shall not be subjected to price escalation and variation on any account, unless otherwise approved by IHO. A submitted Quotation with an adjustable price quotation will be treated as non-responsive and will be rejected.

### **9.3 Validity of Quotation Price**

Quotation shall remain valid for *Ten (10) Calendar days* after the deadline for quotation submission.

In exceptional circumstances, prior to expiry of the period of validity of quotations, IHO may request that the contractors extend the period of validity for a specified additional period. The request and the response thereto shall be made in writing. A contractor agreeing to the request will not be required or permitted to modify its quotation.

### **9.4 Documents Establishing Contractor's Eligibility and Qualification**

The Contractor shall furnish, as part of its quotation, documents establishing the Contractor's eligibility to submit quotation and its qualifications to perform the contract if its quotation is accepted. The IHO's standard Vendors Information Sheet shall be used for this purpose (Annex C). The documentary evidence of the Contractor's qualifications to perform the contract if its quotation is accepted shall be established to IHO's satisfaction:

- (a) that the Contractor has the financial and technical capacity and track record necessary to perform the contract;
- (b) that the Contractor meets other qualification criteria.

## **10. Submission of Quotations**

Quotation must be submitted through email to: [procure@ihosavinglives.org](mailto:procure@ihosavinglives.org) on or before *8.06.2018 at 1700Hrs.*

Late<sup>3</sup> Quotations will not be accepted. Bids shall be opened on *01.06.2018 at 10:00hrs at IHO Juba offices*

## **11. Opening of Quotations**

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<sup>3</sup> Quotation delivered beyond the prescribed date and time shall be considered late, the envelope shall be immediately returned to the Contractor unopened. The date and time of submission of the quotation shall be recorded. A quotation submission log shall be prepared for the purpose.

At the indicated time and place, the opening of Quotations shall be carried out by IHO in the presence of the Contractors who wish to attend. IHO reserve the right to conduct opening of Quotations in public or not.

## **12. Acceptance of Quotations**

IHO is not bound to take an immediate decision on the acceptability or unacceptability of Quotations at the time of their opening.

## **13. Rejection of Quotations**

Quotation can be rejected for the following reasons:

- (a) The Quotation is not presented in accordance with this General Instruction;
- (c) the Quotation Form or any document which is part of the Quotation Document is not signed;
- (d) the Contractor is currently under list of blacklisted Contractors;
- (e) the Contractor offer imposes certain basic conditions unacceptable to IHO
- (f) the offered price is above the approved budget

IHO is not bound to accept any offer received and reserves the right to waive any minor defect in an offer, provided, however, that such minor defect (i) does not modify the substance of the offer and (ii) does not change the relative ranking of the Contractors.

## **14. Evaluation of Quotations**

IHO shall evaluate and compare the Quotations on the basis of the following:

- (a) Completeness and responsiveness of the documents mentioned in 9.1
- (b) Contractors technical and financial capacity to perform the Contract
- (c) Compliance with construction schedule and viable methodology offered.
- (d) Compliance with technical specifications.
- (e) Contractors availability and capacity of equipments;
- (f) Price

Arithmetical errors will be corrected on the following basis. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the total price shall be corrected. If the Contractor does not accept the correction of the errors, its Quotation will be rejected. If there is a discrepancy between words and figures, the amount in words will prevail.

## **15. Post Qualification**

Prior to award, post-qualification will be carried out by IHO to further determine the selected Contractor's technical and financial capability to perform the contract. IHO shall

verify and validate any documents/information submitted and shall conduct ocular inspection<sup>4</sup> of the office, plant and equipment and previous projects.

## **16. Award of Contract**

The Contractor that has submitted the lowest evaluated Price, substantially responsive to the requirements of this General Instruction and who has been determined to be qualified to perform the contract shall be selected and awarded the contract.

IHO shall notify the selected Contractor through a Notice of Award. IHO shall also notify in writing, the other Contractors who were not selected without disclosing the reason for rejection.

## **17. Delivery Site and Period of Delivery**

The works shall be done in *Oyere Boma Torit West County*.

The Works must be completed within *30 calendar days* after five days upon receipt of the Notice to Proceed (NTP).

## **18. Liquidated Damages**

If the Contractor fails to deliver the works within the completion period specified in Clause 17 above, a penalty payment of 0.1% of the cost of unfinished Works for every day of breach of completion schedule will be requested.

## **19. Payment**

Payment shall be made only upon IHO's acceptance of the Works, and upon IHO's receipt of invoice.<sup>5</sup>

IHO may grant an advance payment equivalent to maximum of *10% of* the Contract amount upon submission of a claim and a bank guarantee for the equivalent amount valid until the Works are delivered and in the form provided in Annex J.

## **20. Retention Money**

There will be retention of 10% of each payment, as security for the quality of workmanship, conformance with plans and specifications, and third-party liabilities. Notwithstanding the provisions of the Contract, the 10% retention shall be released after the Contractor has complied with the requirements of the Certificate of Final Acceptance and the warranty period.

The Contractor has the option to substitute the cash retained with an acceptable Bank Guarantee of prescribed form in the same amount (Annex K).

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<sup>4</sup> If applicable.

<sup>5</sup> Insert conditions if progress payment is allowed.

## **21. Settlement of Dispute**

The South Sudan arbitration rules will apply for any dispute, controversy or claim that will arise in relation to the procurement process.



QUOTATION FORM

Date : \_\_\_\_\_

To : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Having examined the General Instruction for the *proposed drilling of Oyere borehole, Torit west County*. the receipt of which is hereby duly acknowledge, I, representing *[name of company]*. offer to execute the requested works in conformity with the General Instruction for the total Lump Sum amount of *[total bid amount in words and figures and currencies]* in accordance with the Priced Bill of Quantities which is herewith attached and form part of this Quotation.

I undertake if my offer is accepted, to deliver the Works in accordance with the Bill of Quantities, delivery schedule, plans and specifications.

I agree to abide by this Quotation for the Validity Period specified in the General Instruction which may be accepted at any time before the expiration of that period.

Until a formal contract is prepared and executed, this Quotation Form, together with your Notice of Award shall constitute a binding agreement between us.

I hereby certify that this Quotation complies with the requirements stipulated in the General Instruction.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_.

\_\_\_\_\_  
*[signature over printed name]*                      *[in the capacity of]*

Duly authorized to sign Quotation for and on behalf of  
\_\_\_\_\_ *[name of company]*

**BILL OF QUANTITIES FORM (SUMMARY)**

**PROJECT TITLE :**

*Proposed drilling of Oyere borehole which entails: Borehole drilling, submersible pump Installation, 1 No. new water kiosk, construction of new 40 m3 elevated water tank, new Toilet and septic tank, caretakers room, generator room, 45KVA genset and chain-link Fencing with M.S gate in Oyere Bay region, South West State.*

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	Borehole drilling	1	Item		
2	Submersible pump procurement & installation with piping system	1	Item		
<b>GRAND TOTAL</b>					

\_\_\_\_\_  
Contractors authorized signature over printed name

**VENDOR INFORMATION SHEET (VIS)**

Name of the Company \_\_\_\_\_

Address  Leased  Owned Area: \_\_\_\_\_ sqm

House No \_\_\_\_\_

Street Name \_\_\_\_\_

Postal Code \_\_\_\_\_

City \_\_\_\_\_

Region \_\_\_\_\_

Country \_\_\_\_\_

Contact Numbers/Address

Telephone Nos. \_\_\_\_\_ Contact Person: \_\_\_\_\_

Fax No. \_\_\_\_\_

E mail Address \_\_\_\_\_ Website: \_\_\_\_\_

Location of Plant/Warehouse  Leased  Owned Area: \_\_\_\_\_ sqm

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Business Organization  Corporation  Partnership  Sole Proprietorship

Business License No.: \_\_\_\_\_ Place/Date Issued: \_\_\_\_\_ Expiry Date \_\_\_\_\_

No. of Personnel \_\_\_\_\_ Regular \_\_\_\_\_ Contractual/Casual \_\_\_\_\_

Nature of Business/Trade

Manufacturer  Authorized Dealer  Information Services

Wholesaler  Retailer  Computer Hardware

Trader  Importer  Service Bureau

Site Development/  
Construction  Consultancy  Others \_\_\_\_\_

Number of Years in business: \_\_\_\_\_

Complete Products & Services

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Payment Details

Payment Method  Cash  Check  Bank Transfer  Others

Currency  Loc.Currency  USD  EUR  Others

Terms of Payment  30 days  15 days  7 days upon receipt of invoice

Advance Payment  Yes  No  % of the Total PO/Contract

Bank Details:

Bank Name \_\_\_\_\_

Bldg and Street \_\_\_\_\_

City \_\_\_\_\_

Country \_\_\_\_\_

Postal Code \_\_\_\_\_

Country \_\_\_\_\_

Bank Account Name \_\_\_\_\_

Bank Account No. \_\_\_\_\_

Swift Code \_\_\_\_\_

Iban Number \_\_\_\_\_

**Key Personnel & Contacts (Authorized to sign and accept PO/Contracts & other commercial documents)**

Name	Title/Position	Signature
_____	_____	_____
_____	_____	_____
_____	_____	_____

Companies with whom you have been dealing for the past two years with approximate value in US Dollars:

Company Name	Business Value	Contact Person/Tel. No.
_____	_____	_____
_____	_____	_____
_____	_____	_____

Have you ever provided products and/or services to any mission/office of IHO?

Yes

No

If yes, list the department and name of the personnel to whom you provided such goods and/or services.

Name of Person	Mission/Office	Items Purchased
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Do you have any relative who worked with us at one time or another, or are presently employed with IHO? If yes, kindly state name and relationship.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Trade Reference

Company	Contact Person	Contact Number
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Banking Reference

Bank	Contact Person	Contact Number
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

## REQUIREMENTS CHECK LIST

Please submit the following documents together with the Information Sheet:

No	Document	For IHO use only	
		Submitted	Not Applicable
1	Company Profile (including the names of owners, key officers, technical personnel)		
2	Company's Articles of Incorporation, Partnership or Corporation, whichever is applicable, including amendments thereto, if any.		
3	Certificate of Registration from host country's Security & Exchange Commission or similar government agency/department/ministry		
4	Valid Government Permits/Licenses		
5	Audited Financial Statements for the last 3 years*		
6	Certificates from the Principals (e.g. Manufacturer's Authorization, Certificate of Exclusive Distributorship, Any certificate for the purpose, indicating name, complete address and contact details)		
7	Catalogues/Brochures		
8	List of Plants/Warehouse/Service Facilities		
9	List of Offices/Distribution Centers/Service Centers		
10	Quality and Safety Standard Document / ISO 9001		
11	List of all contracts entered into for the last 3 years (indicate whether completed or ongoing) *		
12	Certification that Non-performance of contract did not occur within the last 3 years prior to application for evaluation based on all information on fully settled disputes or litigation		
13	For Construction Projects: List of machines & equipment ( <i>include brand, capacity and indication if the equipment are owned or leased by the Contractor</i> )		

\* For Competitive Biddings, number of years may increase depending on the estimated contract amount.

\*\* Indicate if an item is not applicable. Failure to provide any of the documents mentioned above will result in automatic "failed" rating.

I hereby certify that the information above are true and correct. I am also authorizing IHO to validate all claims with concerned authorities.

Received by:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Position/Title

\_\_\_\_\_  
Position/Title

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

**FOR IHO USE ONLY**

Purchasing Organization \_\_\_\_\_  
Account Group \_\_\_\_\_

Industry  001  002  003

where 001 - Transportation related to movement of migrants  
002 - Goods (e.g. supplies, materials, tools)  
003 - Services (e.g. professional services, consultancy, maintenance)

Vendor Type  Global  Local



**CONSTRUCTION SCHEDULE**

Act.No.	Activity Name	Duration in either Weeks or Months							
		1	2	3	4	5	6	7	8
1									
2									
3									
4									
5									
6									
7									
6									
7									
8									
9									
10									
11									
Manpower Allocation & Descriptions									
Equipment Allocation & Descriptions									

The Contractor may use extra pages to furnish additional information or may use other acceptable format to illustrate the construction schedule.

\_\_\_\_\_  
Contractors authorized signature over printed name

**KEY SUPERVISORY STAFF SCHEDULE**  
*(to be assigned for the proposed project)*

<b>Name</b>	<b>Position</b>	<b>Yrs. w/ the Firm</b>	<b>Qualificatio n</b>	<b>Largest Cost of Project Handled</b>	<b>Years of Experienced On said Position</b>
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Attached CV if not yet attached at the eligibility documents submitted.

We hereby certify that the above key supervisory staff is available for use in the execution of the contract.

\_\_\_\_\_  
 Contractors authorized signature over printed name

**EQUIPMENT SCHEDULE**  
*(to be used for the proposed project)*

<b>Type/description</b>	<b>Capacity</b>	<b>Age</b>	<b>Condition/Location</b>
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			

Indicate if it is owned or to be leased.

We hereby certify that the above plant and equipment are available for use in the execution of the contract.

\_\_\_\_\_  
Contractors authorized signature over printed name

## SPECIFICATIONS

### *The Technical Specifications and Procedures*

#### ***Drilling borehole for Oyere borehole in Torit West Conty- Imatong State***

##### *1. LEGAL REQUIREMENTS*

The service provider should be a local Drilling and Construction company legally registered on South Sudan. They should have good understanding and working relationship with the relevant line ministries, local authorities Specially Oyere Payam and communities and/or other NGOs working in the area. They should have an office and organizational profile. They should have extensive experience with proof of drilling boreholes and construction of civic work in South Sudan specially in Torit West Conty- Imatong State areas.

The Service provider who neglects or fails to comply with any order or requirement given or imposed on these technical specifications shall be guilty of default to the contract. Pertinent issues in the schedule with respect to construction of boreholes are here below described:

##### *2. DRILLING SITE*

The service provider shall drill the boreholes at the exact location designated by the IHO IHO, in collaboration with local authorities in Oyere payam is responsible for providing all land, way-leaves and easements for the permanent works. The service provider shall liaise with the local authorities for the said permission and easements. The service provider shall be deemed to have fully informed himself as to the suitability of the roads or tracks to the sites and shall exercise due care in the use of such roads and shall make good any damage caused by their use. The service provider shall provide such temporary tracks to the actual borehole location as are necessary, with as little as possible interference with existing fences and cultivated land. Compensation for damage to crops, fences, etc will not be the IHOs responsibility.

##### *3. ENVIRONMENTAL PROTECTION OF THE SITE*

Care must be taken in the handling and storage of all drilling fluids, oils, greases and fuel on site to avoid any degradation. The service provider shall dispose of any toxic materials, drilling fluid and other additives, cuttings and discharged water in a manner approved by the drilling master so as not to create damage to public and private property.

##### *4. SUBMISSION OF SAMPLES*

Before incorporating in the permanent works any materials or products, which he supplies under the contract, the service provider shall submit to the IHO technical

supervisor of the drilling for his approval a sample of each respective material or product and such samples shall be delivered to and kept by him for reference.

All the respective types of materials and products used in the works shall be at least equal in quality to the approved samples. Each and every sample shall be a fair average of the bulk material or of the product that it represents. The IHO supervisor technical may decide the method by which each sample to be taken from bulk shall be obtained.

#### 5. *WORKMANSHIP*

The service provider is expected to carry out all the works as instructed by the IHO technical supervisor in a thorough and workman-like manner, and up to current professional standards. He shall carry out operations with the efficiency and dispatch in accordance with the terms of the contract and to the satisfaction of the *IHO technical supervisor*. For this purpose the service provider shall use suitable machinery and gear, and supply efficient and experienced staff.

#### 6. *STANDARDS*

The materials used for the construction must conform to internationally recognized standards e.g. ISO Standards current at the date of tender. The service provider shall submit the standards for the materials he proposes at the time of tender.

#### 7. *CONTRACTOR'S PLANT AND EQUIPMENT*

All machinery, equipment and materials to carry out the drilling, test pumping, well-head construction, etc. as specified in the BoQ are to be mobilized to the site. Test Pumping equipment should be independent from the drilling rig (s). At the start of the contract the IHO technical supervisor will verify the specifications and state of repair of all major items of plant. He shall have the right to order the removal and/or replacement of any plant that in his opinion is insufficient or unsatisfactory.

#### 8. *SITE AGENT*

The service provider shall ensure that during the full construction period, a capable site agent shall be present on site.

#### 9. *SUPERVISION OF CONTRACT*

The contract is to be supervised by the IHO appointed technical person. The technical supervisor will work closely with service provider and can be part to the service provider but report to IHO directly.

#### 10. *BOREHOLE DEPTH AND DIAMETER*

The service provider shall drill to such depth and diameter as will be instructed by the technical supervisor appointed by IHO. The borehole will be acceptable if drilled to such depth and diameter other than instructed by the technical supervisor. The recommended borehole diameter shall be 311.15 mm.

## *11. DRILLING METHOD*

The service provider may use any rotary or percussion drilling technique that he feels applicable to achieve the depth and diameters required within the time for completion specified in the contract. However, the service provider should exhibit ownership of at least 1 rotary drilling rigs and percussion drilling ring capable drilling minimum 200m deep to be eligible for this contract.

## *12. SAMPLING OF CUTTINGS*

Representative, continuous samples (minimum, 250 grams) of the strata penetrated shall be collected for each 2-m interval and by whatever method that is standard for the drilling technique in use and approved by technical supervisor. Samples are not to be washed! The samples shall be put into suitable sample bags, labelled with waterproof labels with the depth interval. Geological logging will be the responsibility of the service provider and is to be carried out by his qualified Hydro-geologist.

## *13. TEMPORARY CASING-*

Installation and diameter of any temporary casing required for the construction of the boreholes will be left to the service provider so long as the finished product meets the borehole specifications. Cost for supply, installation and removal of temporary casing shall be borne entirely by the service provider. The service provider shall not claim any casing that is not retrievable and left in the borehole.

## *14. WATER SUPPLY FOR DRILLING/DEVELOPMENT*

The service provider shall make his own arrangements for obtaining, storing, transporting and pumping of water required for drilling/development purposes, and for use by the drilling crew at their campsite. The costs for the same are deemed to be included in the BoQ rates.

## *15. PLAIN AND SCREEN CASING*

The 203-mmØ OD (outer diameter) uPVC plain and screen casing shall have a minimum wall thickness of 9 mm. The collapse resistance of uPVC casing should be minimum, 6.5-kg/square metre, while that for screens shall be minimum, 3.25-kg/square metre. The screen open area shall not be less than 4% and shall have a uniform slot size of 0.5 mm. Aquifer zones shall be completely or partly lined with uPVC screen casing as decided and approved by technical supervisor. Sections of the plain and screen casing shall be provided in maximum lengths of 6 and 3 metres respectively, and joined watertight by flush threaded connections, with the joints having the same structural strength as the plain and screen casings and a sump of minimum, 0.5 metres and maximum 2 metres length. The bottom end shall be sealed with a uPVC bottom cap as shown in the standard design drawing.

- ❖ The technical supervisor in consultation with the Service provider shall provide installation details of the borehole after drilling is completed. One type of standard borehole design is given below;

- ❖ Drill 400-mmØ (diameter) to 2.0 metres depth, case at 375 mmØ (OD) with mild steel casing (wall thickness 5 mm) and cement grout for sanitary seal.
- ❖ Drill with 311-mmØ bit to final depth.
- ❖ Install 203-mmØ (OD) uPVC, (9 mm minimum wall thickness) plain and screen casings as appropriate.
- ❖ Screened sections adjacent to the aquifer zone(s) are to be gravel packed to overlap the plain casing by at least 2 metres.

The plain and screen casings must be centralized in the borehole so that a minimum annular space of 54 mm exists between the borehole wall and the casing. Suitable centralizers should be provided to allow the casings to be set correctly in the centre of the drilled bore. Along the screened sections a centralizer shall be inserted at every 3-metre interval while along the plain casing the interval shall be every 6-metre interval.

#### *16. VERTICALITY*

The Service provider will conduct a vertically test during and after drilling by approved methods to demonstrate that the departure from the verticality does not exceed 3 in 100 between ground level and the base of the borehole. If this departure is exceeded, the Service provider shall make the necessary corrections to the approval of the technical supervisor without additional payment. If the error cannot be corrected, drilling shall cease, and a new borehole shall be drilled at a position nearby as shall be indicated by the technical supervisor. No payment shall be made for the alternative drilling and the sealing of the abandoned borehole or for moving to the alternative point.

#### *17. GRAVEL PACK*

The Service provider shall supply suitable gravel pack. The gravel pack shall consist of well-rounded particles of uniform grading with 90% siliceous material and conform to the 1 – 2 mm diameter. There shall be no clay, shales, silt, fines, excessive amounts of calcareous materials and no crushed rock. The service provider shall be required to submit samples of the material prior to delivery of the supply to be analyzed.

The gravel shall be washed before installation. Sufficient amount of gravel pack shall be installed to completely cover the uppermost screen and yonder by an additional 2-metres to allow for settling. A good supply of water should be introduced with the gravel to prevent bridging. The gravel pack shall be capped with a 2-metre vertical column of clay seal to prevent any seepage that may contaminate aquifers with subsequent pollution of ground water

The annular space above the clay seal shall be back filled with inert drill-cuttings. The quantity of the gravel pack and backfill to be installed shall be measured using a suitable volumetric method as approved by the Technical supervisor.

#### *18. SANITARY SEAL*

To provide an effective seal to the entry of contaminants, up to 2.0-metres depth of the borehole from the surface shall be grouted using cement slurry 1.85-2.15 kg / litre. Grout is to be injected, by a method approved by the technical supervisor, into the annulus between the casing and the wall of the hole. In addition, any aquifer bearing saline or poor quality water shall also be sealed.

## *19. YIELD ESTIMATE DURING DRILLING*

If rotary drilling method is used, a 90° V-notch flow measurement shall be used in the drain line so that continuous monitoring of air -lift yields can be obtained. Care should be taken to ensure that no floating debris impede the flow of water over the V-notch. The weir shall at all times be kept clear of a build up of silt and other fines. The service provider shall provide the calibration curve, to be verified and approved by the technical supervisor, for the V-notch weir. Average yields shall be read and rated at every aquifer struck and as otherwise directed by the technical supervisor. For percussion drilling, a bailer test of at least 30 minutes duration shall be carried out for each aquifer encountered.

## *20. DEVELOPMENT AND CLEANING OF BOREHOLE*

The Service provider shall carry out development and cleaning of borehole by airlifting and air jetting methods upon completion of the drilling and installation of casing and gravel pack. This shall be done to remove silts, clays and drilling fluid residues deposited on the borehole wall and adjacent portions of the aquifer during the drilling process. If organic drilling fluids are used, they shall be broken down chemically according to the manufacturer's recommendations before or during development. Cleaning shall be carried out by airlift pumping, airlift surging, and backwash or jetting. Clay disaggregation by means of sodium hexametaphosphate (Calgo) treatment might be necessary. Development of boreholes shall be done by airlifting and shall be effective from the depth at which water is encountered to the bottom of the borehole. Development shall continue until the water is completely free from fine particles, as to be decided by the technical supervisor. Upon completion of development, any accumulation of material shall be removed from the bottom of the borehole by airlifting.

## *21. TEST PUMPING*

### Establishing Aquifer Parameters by Borehole Test Pumping

Test pumping of borehole enables measures of aquifer and Borehole parameters. The British Standard BS 6316: 1992 Code of Practice for Test Pumping of Water Wells prescribes the following elements of test pumping;

- a) A period of recovery after production pumping/development;
- b) A pre-test (calibration, typically 2 to 3 hours);
- c) A period of recovery after pre-test
- d) A step draw-down test (typically five steps, each of 2 hours duration; total 10 hours);
- e) A period of recovery after step draw-down test
- f) A constant discharge test (typically 48 hours); and
- g) A recovery test (typically 24 hours).

### **Analysis of Test Results**

Step drawdown test results will be analyzed to determine:

- I. The turbulent pressure losses at the well face, and
- II. An estimate of the aquifer's transmissivity to determine a suitable pump rate for the constant discharge test.



The constant discharge test results will be analyzed to determine:

- a) Whether the aquifer is confined, unconfined or semi-confined;
- b) The aquifer's transmissivity; and where measurements from an observation well are also available, the aquifer's storage coefficient.

The service provider shall perform test pumping to establish well performance and yield of the borehole. A test-pumping unit shall be provided for the testing of the borehole. The method for varying the discharge rate of the pumps used will depend on the type of the pump used. The service provider shall provide a suitable means of achieving the rate of flow specified. Test pumping should start at least 12 hours after completion of development and cleaning of the borehole. Sufficient time shall be allowed for the recovery of water levels between each type of test. This shall be at the discretion of the technical supervisor.

Discharge measurements shall be made by volumetric method or otherwise approved calibrated measuring device. During the test pumping, the discharged water must be handled and disposed of in an appropriate manner to a point of overland drainage sufficiently far from the well to prevent recharge. The water shall be diverted over a distance of at least 100-metre from the wellhead. This condition may not be required for confined aquifers but approval to vary this distance must be obtained from the technical supervisor.

During all test-pumping operations, once the flow rate has been determined and preliminary adjustments made, the measured discharge rate shall be maintained within 5% of the required rate for the duration of the test.

Failure of the pump operation during the tests shall require abortion of the whole test and the test shall be repeated after recovery of the water level. No pay shall be made for aborted tests nor for standing time during water level recovery after aborted tests. Test pumping comprises the following activities:

- I. **Calibration Test:** - The borehole shall be subject to calibration test to establish the approximate yield and draw down characteristics and to decide upon pumping rates for step draw down or constant discharge tests. The total duration of calibration test shall not exceed 2 hours.
- II. **Step draw down Test:-** The step draw down test shall comprise pumping the well at three to five separate discharge rates as shall be specified by the Engineer. Each discharge rate shall be pumped for a period of one hour. The change from one pumping rate to the next shall be effected without stopping the pump, but by means of regulating a gate valve in the discharge pipe, or by any other means to be approved by the technical supervisor. The change from one step to the next shall take place in the shortest time possible.

During each step of the draw down test, water levels and discharge measurements shall be taken at appropriate time intervals as shall be instructed by the technical supervisor, while at the same time electrical conductivity (EC) readings shall be taken.

After completion of the last step, the borehole will be tested at a constant discharge for 24 hours (as explained below) after which a recovery test is to be undertaken. For very low yielding boreholes (<3 m<sup>3</sup>/h), the technical supervisor may waive the requirement of step draw down test.

**Constant Discharge Test:** - Separate constant discharge test for maximum duration of twenty-four (24) hours of pumping and twelve (12) hours of recovery shall be implemented at the end of the last step of the step drawdown test. The discharge rate at which the well is to be pumped shall be specified prior to the test. During the test, water

level and discharge measurements shall be taken at the same time intervals as for the step draw down test.

Test pumping data from all tests conducted from the borehole shall be supplied to the technical supervisor. These will show dates, water levels, discharge rates, EC values, times of starting and stopping the pumping, change in discharge, weather and other conditions that could affect the test data.

The total duration of the tests shall not exceed 36 hours and 12 hours recovery, unless with the written instructions of the technical supervisor. No payment shall be made by the IHO for recovery after the calibration test and the step drawdown test.

## *22. WATER LEVEL OBSERVATIONS*

The Service provider shall supply appropriate electric contact level gauges for measuring water levels in the boreholes to the nearest 10-millimetre at pre-determined intervals. Wellhead arrangements shall permit these gauges to be inserted and passed freely. Hereto the Service provider shall be required to install a dipping tube, minimum 19-millimetre internal diameter (ID) lowered approximately 1-metre above the pump intake or approximately 2-metres below anticipated maximum draw down level. Other methods for measuring water levels are subject to the approval by the technical supervisor. Cost of water level observations is included in the BoQ rates for test pumping.

## *23. ELECTRICAL CONDUCTIVITY MEASUREMENTS*

The Service provider shall have an operational EC meter on site to take electrical conductivity readings whenever required during drilling, development and test pumping. Costs of taking these readings are included in the rates for drilling, development and test pumping.

## *24. RECORDS*

The Service provider shall keep daily activity records for each borehole. Separate records shall be supplied for borehole upon completion. The records shall contain the information as specified below.

### **DAILY RECORDS**

Site Name;

Borehole Reference Number;

Date of Reporting;

Names of Drilling Team Staff;

Drilling Method;

Bore Diameter and depth, including diameter changes and their corresponding depths;

Depth of the Bore at the start and end of shift/working day;

Depth and size of casing at start and end of shift/working day;

Description of rocks drilled with depths of transitions encountered;

Depths of water struck levels;  
Depth of main aquifer;  
Estimated yield of airlift measurement when drilling and developing with air;  
Time log (min/metre), for penetration rates for given type of bit and standby time due to breakdown;  
Depth intervals at which each formation samples are taken;  
Records of components and quantities used or added to the drilling or air;  
Water level at the start of each working day;  
EC measurements;  
Problems encountered during drilling;  
Details on installation in the borehole (if any);  
Depth and description of well plain and screen casing, and  
Details of work to be invoiced at hourly rates (e.g. test pumping).

A copy of the daily record shall be made available daily to the technical supervisor for signature, including any other pertinent data as may be requested by the technical supervisor.

#### **BOREHOLE COMPLETION RECORDS**

The borehole completion record should include the following.  
Driller's log;

Copy of Hydro-geological/Geophysical Survey Report

Copy of standard chemical water quality test, and

Borehole design and installation details (as-built drawing).

A copy of borehole completion record shall be made available to and approved by the technical supervisor on completion of each borehole.

#### *25. WATER SAMPLING*

Water samples for testing the chemical water quality will be taken by the Service provider at the end of the test pumping. The Service Provider shall take the samples to a qualified laboratory for bacteriological and chemical analyses. OM will assist and bear the cost of the analysis and related charges.

#### *26. CAPPING THE BOREHOLE*

During borehole construction, installation, development and test pumping, the Contractor shall use all reasonable measures to prevent entrance of foreign matter into the borehole. The Service provider shall be responsible for any objectionable materials that may fall into the borehole and any effect it may have on water quality and/or quantity until completion of works and acceptance by the technical supervisor and/or the IHO

#### *27. ACCEPTANCE OF BOREHOLES*

The boreholes shall only be accepted by the technical supervisor and the IHO upon satisfactory completion of all borehole construction operations as per the technical specifications and the service provider provided borehole “passport”. IHO have the right to denied to accept the borehole if it the quality of the service are under substandard and service provider denies to improve it.

## *28. LOSS OF EQUIPMENT*

Any equipment lost down a borehole must be removed or the borehole will be considered a lost bore. A replacement borehole will have to be constructed and tested at the Contractor’s expense.

## *29. LOST BORE*

Should any incident to the plant, behaviour of the ground, jamming of tools or casing, or any other cause prevent the satisfactory completion of the works, a borehole shall be deemed lost and no payment shall be made for that bore or for any materials not recovered there from, nor for any time spent during drilling or while attempting to overcome problems.

In the event of a lost bore, the Service provider shall permanently seal the bore and construct a borehole immediately adjacent to the lost bore or at a site indicated by the Engineer. The option of declaring any bore lost shall rest with the service provider, subject to the approval of the technical supervisor.

The abandoned borehole shall be treated as follows.

The Service provider may salvage as much casing from the bore as possible and use it in the alternative borehole with the approval by the technical supervisor;

Salvaged materials shall be property of the service provider;

The lost bore shall be sealed by concrete, cement grout, or neat cement, and shall be placed from bottom upwards by methods that avoid segregation or dilution of materials, and

The upper two (2)-metres of the bore shall be backfilled with native topsoil. Sealing of the bore shall be done in such a manner as to avoid accidents and to prevent it from acting as a vertical conduit for transmitting contaminated surface or subsurface waters into the water bearing formations.

## *30. STANDBY TIME*

In the event of delays occurring as a result of action or inaction by the technical supervisor for which the Service provider would be entitled to claim standby time, the service provider should notify the technical supervisor immediately in writing that such claims are becoming applicable.

## *31. CONSTRUCTION OF WELLHEAD*

The service provider shall, on completion of each borehole, cap the top of the borehole with a 5-mm-thick mild steel blank flange. The blank flange shall be 300-mm above the ground level and be spot-welded to the 2-m long mild steel casing coated internally and

externally with two coats of non-toxic bitumen or epoxy paint to the approval of the technical supervisor.

This casing shall fit neatly over the uPVC casing and be permanently grouted in at the time of completion of the borehole. Prior to, during and after the construction of the wellhead, the service provider must ensure that no debris whatsoever falls into the borehole.

### *32. WELL DISINFECTION*

Disinfection of the borehole shall be carried out by the service provider before demobilization from the site. This shall be done by placing a chlorine solution into the well so that a concentration of at least 50 mg/l of available chlorine exists in all parts of the borehole at static conditions. All the borehole surfaces above the static water level shall be completely flushed with the solution. The solution shall remain in the borehole for a minimum of 2 hours before pumping the borehole to waste.

### *33. CLEARING THE SITE*

On completion of each borehole, the site must be left clean and free from all debris, hydrocarbons and waste, and all pits filled to the approval of the technical supervisor. A site not delivered clean may render the borehole unacceptable.

### *34. STANDARD BOREHOLE DESIGN*

Top section of 2.0-m drilled at 400-mmØ and 375-mmØ OD, 5-mm wall-thickness, mild steel temporary casing installed and grouted. Borehole drilled at 311.15-mmØ to final depth of 200m. Install 203-mmØ OD uPVC, 9-mm (minimum) wall-thickness, plain and screen casing. Screened sections adjacent to the aquifer zones at depths as instructed by the technical supervisor. In case there is a need to drill deeper more than 200 m, the service provider should request approval from the technical supervisor. The screened sections to be gravel packed and sealed on top with clay seal

## ANNEX 5: Borehole “Passport”

<b>Client:</b> IHO	<b>WASH Project</b>	<b>Project code:</b>
<b>Contract N°:</b>	<b>Execution schedule:</b>	<b>GPS Coordinates:</b>
<b>Region:</b>	<b>District:</b>	<b>Community name:</b>
<b>Borehole ID:</b> <i>(code of the borehole)</i>		<b>Date of the intervention:</b>
<b>Borehole Specification</b>		
Diameter of casing		
Type of casing (metallic, UPVC)		
Depth of borehole		
Depth of casing		
Level of screen(s)		
Height of sand trap		
Bottom cap (yes/no)		
Completion date of drilling		
<b>Pump Specification</b>		
Pump type and brand		
Serial No. of the cylinder		
Serial No. of the pump stand		
<b>Hydrological Specification</b>		
Static level of water		
Drawdown		
Recovery time		
Yield (liters / hour)		
Water quality testing		<i>(IHO WASH team will advise parameters to test)</i>

The document will be signed off by the entities responsible of the drilling the Client (IHO), the service provider (Contractor) and Representative of the local authorities.