REQUEST FOR EXPRESSIONS OF INTEREST
(CONSULTANT SERVICES – SELECTION OF FIRMS)

LEBANON
WATER SUPPLY AUGMENTATION PROJECT (BISRI DAM)
WATER AND SANITATION SECTOR

CONSULTING SERVICES FOR CONSTRUCTION SUPERVISION OF WASTEWATER NETWORKS AND TREATMENTS SYSTEMS IN THE UPSTREAM CATCHMENT VILLAGES

Mode of Financing: Istisna'a
Financing No. 2LE0087

The Government of Lebanon has received financing from the Islamic Development Bank (IDB) toward the cost of the implementation of the Water Supply Augmentation Project (WSAP/Bisri Dam), that includes, among other components, the implementation of wastewater networks and treatment systems in the upstream catchment villages in the Chouf and Jezzine cazas, a component financed by the IDB.

The Council for Development and Reconstruction (CDR), Project's implementing agency on behalf of the Government of Lebanon, intends to apply part of the proceeds for the Construction Supervision Consultancy Services for the wastewater networks and treatment systems in the upstream catchment villages.

The services include fulfilling the role of Engineer, to administer the construction contract and to supervise the works to be performed with regards to the wastewater treatment plants and networks in the Jezzine and Chouf villages. The works will be divided into lots that include the execution of wastwater networks with a total length of around 150 km (ranging between 40 and 60 km per lot), the design and construction of a total of 4 wastewater treatment plants with a total capacity of 86,500 population equivalent (ranging between 8,000 PE and 35,000 PE per WWTP), and the rehabilitation of 7 existing wastewater treatment plants with a total capacity of 19,700 PE (ranging between 1,500 PE and 6,000 PE per WWTP). The implementation of the new WWTPs and the Networks extends over 24 months, including the rehabilitation of the existing WWTPs estimated to extend over 6-9 months, in parallel. Operation and Maintenance of the WWTPs extends over 24 months, starting at Completion. The Consultant will therefore be in charge of supervising the works of three (3) different Contractors (with Lot 4 as additional optional) in 2 different cazas (Chouf and Jezzine) simultaneously and should therefore make the necessary provisions in terms of staffing and logistics.

The detailed Terms of Reference (TOR) for the assignment can be found at the following link: www.cdr.gov.lb/procurement

The CDR now invites eligible consulting firms ("Consultants") to indicate their interest in providing the services. Interested Consultants must provide specific information which demonstrates that they are fully qualified to perform the services (brochures, description of similar assignments, experience in similar conditions, availability of appropriate skills among staff, etc.).

- The shortlisting criteria are:
    - A duly signed Cover Letter stating the Interest of the Consultant in providing the mentioned services.
    - A general and concise presentation of the firm(s) (brochures, statements of type, property, and key tasks etc...).
    - Certified statements and balance sheets showing financial capabilities (turnovers, assets, liabilities, lines of credit etc.), for the lead and associated partners, and for the last five years for each.
    - List of relevant similar Wastewater Projects, ongoing and/or completed within the last 10 years, indicating the provided services, the percentage of participation in JV consortiums (if any), and the size of relevant contracts (in USD or equivalent and in Man-Months).
    - Detailed description of at least three (3) assigned similar projects with similar services (construction supervision) in Wastewater Networks & Treatment Systems.
    - Overall firm's employees' number, list of available personnel and structure (number, list, organization structure etc. of the core, backstopping and supporting staff).

Eligible firms, which have submitted the necessary statements in a satisfactory responsive way, will be evaluated.

The attention of interested Consultants is drawn to Paragraphs, 1.23, and 1.24 of the Guidelines for Procurement of Consultant Services under Islamic Development Bank Project Financing (the "Procurement Guidelines"), setting forth IsDB's policy on conflict of interest.

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.

A consultant will be selected in accordance with the Quality and Cost Based Selection (QCBS) method set out in the Procurement Guidelines.

Interested consultants may obtain further information at the address below during office hours (from 8:00 to 13:00 Beirut local Time).

Council for Development and Reconstruction (CDR) - Tenders Department
Tallet Al-Serail, Beirut (BCD), Lebanon
Tel. +961-1 980 096
Fax +961-1 981 255
www.cdr.gov.lb

Expression of Interest must be delivered to the address above not later than 12:00 noon, Beirut local time on **Wednesday April 28th, 2021**, mentioning as reference:

"Water Supply Augmentation Project (Bisri Dam) - Wastewater Networks and Treatment Systems Contract.
Expression of Interest for Construction Supervision Consulting Services"

REPUBLIC OF LEBANON

MINISTRY OF ENERGY AND WATER

COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION

Water Supply Augmentation Project (Bisri Dam)

TERMS OF REFERENCE

Consultancy Services for Construction Supervision

Of

Wastewater Networks and Treatment Systems in Chouf and Jezzine cazas

(Loan No. 2LE0087 – Project No. LBN-0087)

December 2020

Abbreviations and Acronyms

BCF	Budget and Cost Forecast
BMLWE	Beirut & Mount Lebanon Water Establishment
BP	Bank Policy
CDR	Council for Development and Reconstruction
CEMP	Construction Environmental Management Plan
CESMP	Construction Environmental and Social Management Plan
CMS	Construction Method Statement
CoM	Council of Ministers
CSQA	Construction Supervision & Quality Assurance
CSQASP	Construction Supervision & Quality Assurance Safety Plan
DB	Dispute Board
DLP	Defects Liability Period
DSP	Dam Safety Plan
DSPOE	Dam Safety Panel of Experts
EDL	Electricité du Liban
EHS	Environmental Health and Safety
EMP	Environmental Management Plan
EPP	Emergency Preparedness Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESPOE	Environmental and Social Panel of Experts
EU	Environmental Unit
GBML	Greater Beirut and Mount Lebanon
GIS	Geographic Information System
GoL	Government of Lebanon
HPP	Hydropower Plant
ICB	International Competitive Bidding
IDB	Islamic Development Bank
IFC	International Finance Corporation
LRA	Litani River Authority
MoE	Ministry of Environment
MoEW	Ministry of Energy and Water
NGL	Natural Ground Level
O&M	Operation and Maintenance
OJT	On-the-Job Training
OP	Operational Policy
PMU	Project Management Unit
RAP	Resettlement Action Plan
SBD	Standard Bidding Documents
SIU	Sector Implementation Unit
SPD	Standard Practice Documents
TOR	Terms of Reference
WB	World Bank
WSAP	Water Supply Augmentation Project

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1. INTRODUCTION

The Water Supply Augmentation Project's (WSAP) main objective is to increase the volume of water available to the Greater Beirut and Mount Lebanon (GBML) region. The project's targets will be achieved through the construction of a multipurpose dam (Bisri Dam), a water treatment plant at Wardanieh, a conveyance pipeline system, a hydropower plant, wastewater networks and treatment systems in the dam catchment area. WSAP is jointly financed by the World Bank, IDB, and GOL under parallel financing arrangement.

The main components financed by IDB are:

- 12 MW Hydropower Plant in Joun and Water Conveyance Pipeline (HPP)
- Expansion of the Wardanieh Water Treatment Plant (Phase II) (WTP)
- Wastewater Networks and Treatment Systems for regions located in the dam catchment area (WWNTS)

The CDR had initiated the Project following the consent of the Council of Ministers (CoM) and at the request of the Ministry of Energy and Water (MoEW).

The Litani River Authority (LRA) will own and operate the hydropower plant, while the Wardanieh water treatment plant and the wastewater networks and treatment systems will be owned and operated by Beirut and Mount Lebanon Water Establishment (BMLWE).

The Terms of Reference (TOR) is for the intended engagement of a Consulting firm to provide the engineering consulting services required for the Construction Supervision of the Wastewater Networks and Treatment Systems that are to be implemented by the CDR as the Client.

2. PROJECT DESCRIPTION

2.1. Wastewater Networks and Treatment Systems (WWNTS)

The wastewater from the areas located in the watershed of the dam reservoir will be treated to secondary treatment level before discharge in order to safeguard the water quality entering the downstream water treatment plant at Wardanieh.

The WWNTS component includes: (i) Networks including the renewal of the existing Networks where needed in different parts of the two Cazas and implementation of new networks in all the villages (Chouf & Jezzine) of the Bisri Dam Catchment, (ii) Collection component including the pumping / lifting stations and the main collector (pumping and/or gravity) lines, and (iii) Wastewater Treatment Plants (WWTPs), including newly proposed ones of capacities ranging between 15,500 PE to 35000 PE, and the existing WWTPs to be upgraded.

The WWNTS component is divided into 4 lots, each lot including wastewater treatment plants (existing and/or new), networks, and pumping stations. It is to note that the implementation of Lot 4 is considered for now tentative/optional.

The tendering of the Works is conceived such that no more than one (1) lot is awarded to one single Contractor, knowing that:

- Award is conducted starting from Lot 1 to Lot 3 respectively (Lot 4 is optional and could be excluded from tendering), and respective bids are opened in this sequence.

- Lot 1 is awarded to the Pre-Qualified Contractor whose offer has been determined to be the lowest evaluated bid and is substantially responsive to the Bidding Document.

- The Contractor awarded Lot 1 would not be eligible to be selected for lots 2 and 3, and accordingly his offers for these remaining lots are automatically eliminated.

The same process is applied for lots 2 and 3 respectively and progressively, taking into account that no more than 1 lot will be awarded to one single Contractor. Accordingly, **the Engineer will be in charge of supervising three (3) different Contractors (with Lot 4 as additional optional) and should therefore make the necessary provisions in terms of staffing and logistics.**

<u>Brief description for Lot 1 activities:</u>
They consist in the Design, Construction and Operation and Maintenance and Staff Training of the following WWTP:

- Bhannine WWTP: An activated sludge WWTP realizing carbon, nitrogen and phosphorus reduction as well as tertiary treatment to comply with the ELV limits required for effluent discharge in the project area. The capacity of the WWTP is around 28,000 PE in Stage I (Horizon 2035) and around 42,000 PE in Stage II (corresponding to a horizon exceeding 2050). In principle, the main components of the WWTP to be executed within the scope of the contract shall correspond to Stage I.
- Around 59 Km of networks in the villages of Jezzine, Ouadi Jezzine, Aaray, Harf, Midane, Machmouche, Benouati, Bkassine, Ghobatiye and Bhannine (Jezzine caza). The majority of these lines is located in existing roads and public properties.
- Around 3 Km of main collector to be laid within the Jezzine river and extending from Jezzine to Bhannine WWTP site

- Pumping stations in: Jezzine (1) and Midane (1)

Brief description for Lot 2 activities:

They consist in the Design, Construction and Operation and Maintenance and Staff Training of the following WWTPs:

- Jdaideh WWTP: An activated sludge WWTP (or MBBR WWTP – Technology still under evaluation and finalization), completely replacing the existing WWTP, and realizing carbon, nitrogen and phosphorus reduction as well as tertiary treatment to comply with the ELV limits required for effluent discharge in the project area. The capacity of the WWTP is around 35,000 PE in Stage I (Horizon 2035) and around 52,500 PE in Stage II (corresponding to a horizon exceeding 2050). In principle, the main components of the WWTP to be executed within the scope of the contract shall correspond to Stage I.
- Rehabilitation (including civil and electromechanical works) of the following existing WWTPs:
    - Moukhtara WWTP: An existing WWTP using a process similar to the one described in Amatour WWTP. Its capacity according to the Beirut and Mount Lebanon Water Establishment (currently in charge of its operation) is around 3,000 PE
    - Maaser ech Chouf WWTP: An existing WWTP using a process similar to the one described in Amatour WWTP. Its capacity according to the Beirut and Mount Lebanon Water Establishment (currently in charge of its operation) is around 3,000 PE
    - Khreibeh WWTP: An existing WWTP using a process similar to the one described in Amatour WWTP. Its capacity according to the Beirut and Mount Lebanon Water Establishment (currently in charge of its operation) is around 3,000 PE
    - Mrousti WWTP: An existing WWTP using a process similar to the one described in Amatour WWTP. Its capacity according to the Beirut and Mount Lebanon Water Establishment (currently in charge of its operation) is around 1,500 PE
- Around 40 Km of networks in the villages of Jdaideh, Ain Ouzain, Batloun, Kahlounieh, Mokhtara, Botme, Baadarane, Maaser ech Chouf, Mrousti, Khreibe (Chouf caza). The majority of these lines is located in existing roads and public properties.
- Pumping stations in: Ain Ouzain (1), Botme (1), Batloun (1) and Kahlounieh (1)

Brief description for Lot 3 activities:

They consist in the Design, Construction and Operation and Maintenance and Staff Training of the following WWTPs:

- Mazraat el Chouf WWTP: An activated sludge WWTP realizing carbon, nitrogen and phosphorus reduction as well as tertiary treatment to comply with the ELV limits required for effluent discharge in the project area. The capacity of the WWTP is around 15,500 PE in Stage I (Horizon 2035) and around 23,250 PE in Stage II (corresponding to a horizon exceeding 2050). In principle, the main components of the WWTP to be executed within the scope of the contract shall correspond to Stage I.
- Bater WWTP: An extension of the existing activated sludge WWTP. The WWTP system (existing WWTP and its extension) must realize carbon, nitrogen and phosphorus reduction as well as tertiary treatment to comply with the ELV limits required for effluent discharge in the project area. The capacity of the WWTP

system (i.e. existing WWTP and its extension) is around 12,000 PE in Stage I (Horizon 2035) and around 18,000 PE in Stage II (corresponding to a horizon exceeding 2050). Note: The capacity of the existing WWTP could be considered as around 4,000 PE (hence, the capacity of the WWTP extension to be executed corresponds to 8,000 PE (Stage I)). In principle, the main components of the WWTP to be executed within the scope of the contract shall correspond to Stage I.

- Rehabilitation (including civil and electromechanical works) of the following existing WWTPs:
    - Jbaa WWTP: An existing WWTP using a process similar to the one described in Amatour WWTP. Its capacity according to the Beirut and Mount Lebanon Water Establishment (currently in charge of its operation) is around 1,500 PE
    - Baadarane WWTP: An existing WWTP using an activated sludge process with chlorination and sludge management by drying beds. Its capacity according to the Beirut and Mount Lebanon Water Establishment (currently in charge of its operation) is around 1,600 PE
    - Amatour WWTP: An existing WWTP using a mixture of activated sludge and trickling filter process with chlorination and sludge management by drying beds. Its capacity according to the Beirut and Mount Lebanon Water Establishment (currently in charge of its operation) is around 6,000 PE
- Around 48 Km of networks in the villages of Mazraat el Chouf, Kahlounieh, Baadarane, Jbaa, Amatour, Ain Qonie, Haret Jandal, Niha and Bater (Chouf caza). The majority of these lines is located existing roads and public properties.
- Pumping stations in: Bater (1), Baadarane (1), Amatour (1), Ain Qonie (1), Jbaa (1), Haret Jandal (1) and Mazraat el Chouf (1)

Brief description for Lot 4 activities (Optional):

They consist in the Design, Construction and Operation and Maintenance and Staff Training of the following WWTPs:

- Bkifa WWTP: An activated sludge WWTP realizing carbon, nitrogen and phosphorus reduction as well as tertiary treatment to comply with the ELV limits required for effluent discharge in the project area. The capacity of the WWTP is around 20,000 PE in Stage I (Horizon 2035) and around 30,000 PE in Stage II (corresponding to a horizon exceeding 2050). In principle, the main components of the WWTP to be executed within the scope of the contract shall correspond to Stage I.
- Ainbal WWTP: An extension of the existing activated sludge WWTP. The WWTP system (existing WWTP and its extension) must realize carbon, nitrogen and phosphorus reduction as well as tertiary treatment to comply with the ELV limits required for effluent discharge in the project area. The capacity of the WWTP system (i.e. existing WWTP and its extension) is around 24,500 PE in Stage I (Horizon 2035). Note: The capacity of the existing WWTP could be considered as around 15,000 PE (hence, the capacity of the WWTP extension to be executed corresponds to 9,500 PE (Stage I)). In principle, the main components of the WWTP to be executed within the scope of the contract shall correspond to Stage I.
- Around 79 Km of networks in the villages of Bayqoun, Bsaba, Jleiliye, Mazraat El Dahr, Mtolle, Zaarouriyeh, Mazmoura, Bkifa, Anout, Hasrout, Ainbal, Semqanieh, Gharifeh (Chouf caza). The majority of these lines is located existing roads and public properties and a section of the main collector will be located within the Bkifa River.
- Pumping stations in: Bsaba (3), Bayqoun (1)
- **This lot is optional and may be excluded from the tender.**

2.2. Project Implementation Time Frame

The project is divided into 2 main sub-components: Wastewater Treatment Plants (WWTPs) and Wastewater Networks. As described in the previous section, the WWNTS component is divided into 4 lots, noting that the implementation of Lot 4 is currently considered tentative/optional. The contract for each lot will be a combination of DBO (Design-Build-Operate) with regard to the WWTPs, and Works with regard to the networks; the implementation of the new WWTPs and the networks extends over 24 months. The contract also includes the rehabilitation of several existing WWTPs and these works are estimated to extend over 6-9 months, in parallel with the execution of the new WWTPs. Operation and Maintenance of the WWTPs extends over 24 months, starting at Completion. It is to note that Works Contracts for the abovementioned lots can have different Commencement dates, and hence the Consultant should plan accordingly.

2.3. Project Procurement Arrangements

The project's procurement includes the Contract for the Design, Construction, Operation, and Maintenance of the Wastewater Treatment Plants, and Execution of Wastewater Networks based on a combined form of DBO (Design-Build-Operate) and Works contract.

The WWNTS component will be based on International Competitive Bidding limited to firms from Member Countries (ICB/MC). The task for assistance during prequalification and bidding will be undertaken by the Designer consultant.

3. SCOPE OF CONSULTING SERVICES

3.1. General

The objective of the assignment is the provision of consultancy services to fulfill the role of Engineer, to administer the construction contract and to supervise the works to be performed with regards to the Wastewater Treatment Plants, carrying out such duties and responsibilities as are described in this Contract. The objective will be to ensure that the works are carried out to a high standard of workmanship and materials, as scheduled and within budget, in accordance with the specifications and drawings of the Contract, to acceptable environmental standards and in accordance with CDR's requirements.

The time for Completion of the Wastewater Treatment Plants is 24 months. Rehabilitation works on existing WWTPs are expected to last between 6 and 9 months, in parallel with the execution of the new WWTPS. Operation and Maintenance period will extend over 24 months, starting at Completion. It is to note that Works Contracts for the abovementioned lots can have different Commencement dates, and hence the Consultant should plan accordingly.

The Engineer, as Employer's Representative, shall administer and supervise the Contractors to ensure the timely progress of the Wastewater Networks works, to ensure that the works are carried out in accordance with the approved design and specifications, and that the

quality of works meets the standards and specifications required in the technical documents. This includes the assessment and monitoring of construction programs, materials, labor, construction methods, in compliance with specified construction methods.

The services shall be undertaken in accordance with the contract requirements of the Engineer or any sub-consultant staff (if any) working under his direction. The Engineer's supervision team shall comprise suitably qualified and experienced Wastewater Networks and Treatment specialists who understand the design and construction requirements for a project of this type.

The time for Completion of the Wastewater Networks is 24 months, in parallel with the WWTPs works.

All deliverables by the Engineer shall be, as much as possible, in accordance with the Management Procedures for the Submissions from Consultants issued by the Sector Implementation Unit (SIU). In particular, the Engineer shall refer to the Standard Practice Documents (SPDs), as reference and non-bidding documents, prepared by SIU for overall and general guidance of Consultants on submissions of complementary designs (if any) and reports. These documents set out generally accepted good practice for design of Water installations. The current list of Standard Practice Documents relating to water projects, attached herewith under Annex 2, is as follows:

- SPD2- Health and Safety in Design,
- SPD4- Mechanical, Electrical and Instrumentation Systems,
- SPD5-Water Transmission and Distribution Systems,
- SPD6-Water Treatment,
- SPD7-Water Pumping Stations,
- CDR Safety, Health and Environment Regulations etc...

The Engineer shall be managed by the CDR and shall act in full cooperation with the Ministry of Energy and Water (MOEW), Beirut and Mount Lebanon Water Establishment (BMLWE), Litani River Authority (LRA), Ministry of Environment (MoE) and other authorities, and with other consultants designing and supervising infrastructure and water works in the Project Area.

The Engineer shall operate a Quality Management System, generally in accordance with ISO9001:2008 series (or similar approved), and SIU Management Procedure - Quality Assurance for Consultants (or similar approved), copy attached under Annex 2, and shall permit and give all required assistance to CDR to audit the operation of the system.

3.2. Overall Responsibilities of the Engineer

The services to be provided by the Engineer shall include, but shall not be limited to the following:

- *Fulfill the role of Engineer as defined in the harmonized FIDIC forms for the WSAP IDB-financed component Wastewater Networks and Treatment Systems (WWNTS)*
- *Manage the Project and administer the Construction Contract(s) on a day-to-day basis;*
- *Ensure implementation of works Quality Assurance procedures as per the applicable Guidelines and Policies;*

- *Provide Technical Assistance in the form of Intensive Site Supervision, Contract Administration and office back-up supportive services during the construction period of the assigned supervision contract;*
- *Ensure that the works are carried out in accordance with the provisions of the contract and with professional skill and care for the orderly progress and satisfactory completion of the Project;*
- *Carry out field and office back-up consultancy services in coordination with CDR for the day-to-day Management of the Project. The time limits established in the construction schedule approved by CDR shall not be extended by the Engineer without prior approval of CDR;*
- *Ensure implementation of the ESIA/ESMP and RAP as per the IDB and World Bank applicable Safeguard Policies and EHS Guidelines*

3.3. Consultancy Tasks during Mobilization Period

3.3.1. Organization and Mobilization

This shall involve planning and mobilizing the overall site supervision activities, and shall include the following (not a limitative list):

- Establishing all necessary communication procedures between the CDR, Engineer, Contractors and others;
- Defining the tools and procedures for effective management of the project;
- Preparing the organizational structure of the management team (including the key staff of the Contractors) and define responsibilities;
- Clarifying organizational relationships and roles.

3.3.2. Review of Contractors' Planning and Programming

The Engineer shall ensure early liaison between the CDR, the Contractors and concerned authorities (when needed).

The Contractors are required to prepare a construction program (Schedule), which shall be reviewed by the Engineer against proposed resources and activities. The Engineer shall provide feedback on how this program can be improved. The Engineer shall provide assistance to the Contractors when needed in the development or updating of this program. Such assistance includes the finalization of this program based on the available resources with Contractors' Liability and Responsibility intact. Careful considerations should be made in terms of all proposed resource allocations and assumed productivity, which are the basis of the construction program.

3.3.3. Review Construction Drawings

For the wastewater treatment plants, the Engineer shall review the Contractors' designs and perform any complementary or alternative designs deemed necessary for the proper execution of the project, as determined by CDR.

Regarding the wastewater networks, construction drawings are prepared by the design consultant to a level considered to be suitable for tender and construction. The Engineer shall review these drawings to confirm that sufficient details have been provided for construction. The Engineer shall perform any complementary or

alternative designs deemed necessary for the proper execution of the project, as determined by CDR.

The Engineer shall respond to all submissions from the Contractors within 21 calendar days of receipt, stating either:

- That no non-conformity with the construction contract requirements have been found in the submission, or
- That the submission fails to comply with the construction contract requirements and stating in which points the submission fails to comply.

The Engineer, with no delay, should approve the presented shop drawings, where found acceptable. The Engineer shall also notify the Contractors to introduce the required corrections on the unsuitable and disapproved drawings. Copies of communications shall be forwarded to the CDR for information.

3.3.4. Assist with access to the site

The Engineer shall liaise with CDR in progressing the availability of land, giving such assistance as is necessary, in order to ensure the access of the Contractors to the site.

3.3.5. Land expropriation

Expropriation files are prepared by the design consultant and CDR is taking steps to acquire the land. The Engineer shall liaise with CDR in progressing the expropriation of land, giving such assistance as is necessary, in order to ensure that the sites are available to meet the Contractors' construction program. The Engineer shall process any additional expropriation or correct already prepared expropriation documents that may arise during construction as required by CDR and in line with the RAP.

3.3.6. Identify and protect antiquities

The Engineer shall monitor the implementation of the ESMP and all relevant sections related to cultural heritage and archaeology. The Engineer will coordinate with the Ministry of Environment (MoE) and with the Ministry of Culture (Directorate of General Antiquities - DGA) to examine existing records to ascertain the probable location of antiquities which may be affected by the works. If any antiquity is revealed during the initial archeological investigations or later-on during construction works, the Engineer shall instruct the Contractors to take necessary measures to rescue this antiquity by displacing it and shall notify CDR without delay.

3.3.7. Other tasks to be performed

More specifically, the Engineer is responsible for the fulfillment of all tasks stated below (not a limitative list):

a- Review the Contractors' work program for compliance with major planning standards and techniques;

b- Evaluate the Contractors' detailed plan including equipment mobilization, material procurement and delivery;

c- Check that the program includes all major milestone activities;

d- Check the arrangements with statutory authorities for the supply of

necessary services;

e- Assist as necessary on the required permitting works requisite for the works;

f- Ensure that the project is planned to be implemented effectively;

g- Develop responsibility matrices for each member of the supervision team;

h- Prepare the work breakdown structure, responsibility matrix and master summary schedules;

i- Determine the external factors that might influence the project;

j- Identify potential problem areas and obstacles that may affect the works and progress, and recommend appropriate actions;

k- Approve the site for the Contractors' base camp, including the layout and adequacy of the facilities for all staff;

l- Coordinate the effective and sufficient establishment of site office, camp, and testing equipment provided by the Contractors;

m- Advise the CDR on the suitability of additionally introduced Sub-Contractors (if any) during implementation for minor construction activities;

n- Agree with the CDR and the Contractors on the format for various forms and reports;

o- Agree on the schedule for submission and the types of reports to be prepared;

p- Participate in the "handing over" committees for the initial handing over of the site to the Contractors, and in the issuance of the commencement orders, after ensuring that the site possession process meets the requirement of the construction contract.

q- Review and instruct the Contractors, at early start of the construction, to implement the Health & Safety[1] and Environmental monitoring and mitigation measures in line with Environmental and Social Management Plan (ESMP).

3.4. Supervision of Contract Works

3.4.1. Engineer function

The conditions of contract for the construction of water supply systems are based on the IDB standard versions of contract. The Consultant shall fulfill the role of the Engineer when supervising the Works, under the required stipulations to obtain the specific approval of CDR, when needed. The scope of these actions will be defined at the time of negotiating the contract.

3.4.2. Construction Works, Materials Inspections and Approvals

The Engineer shall supervise and inspect the construction works including, but not limited to, the following activities:

[1] As per section 3.11 below

- supervising and inspecting the works of the Contractors and suppliers for completion of the contract in accordance with plans and specifications;
- monitoring environmental and health and safety requirements, whether specified or not, and ensuring that requirements are fulfilled;
- taking photographs and videos during construction and installation and keeping a daily diary of construction activities;
- supervising all tests to be carried out by the Contractors and suppliers;
- supervising and preparing final evaluation of all measurements made by the Contractors including the provision of all necessary measurement instruments;
- supervising the assembly, installation, preliminary tests, initial operation and preparation for commissioning of all machinery and equipment on site;
- supervising through qualified inspectors jointly with CDR, the execution of the acceptance tests prior to convening the taking over committee for issuing the Taking Over Certificate;
- preparing and submitting to CDR the inspection, test reports, and certificates of acceptance;
- supervising the commissioning of all structures and plants. The Engineer shall follow procedures prepared by CDR including involvement of concerned operating staff, co-ordinate testing and commissioning programs and prepare taking over certificates;
- administer day-works as required;
- follow up on the manufacturing or supply of all major equipment to ensure compliance with the specifications, including monitoring of certificates of origin, and supervise their delivery to ensure compliance with contractual time schedules;
- follow up on packing, transportation and delivery, as well as temporary storage, and supervise the storage at site of all equipment, materials and supplies;
- promote a good working environment and monitor labor relations, living conditions, health and safety programs, and community relations to be able to identify potential problems and solve them promptly as set forth in the various contracts;
- ensure that the Contractors comply with the contract in respect of insurance;
- ensure that the Contractors comply with the IDB/World Bank and the EHS regulations issued by CDR.

3.4.3. Basic supervision tasks during Construction period

During the Construction Period, the Engineer shall assist the CDR in all aspects of supervision of the construction of the works in accordance with sound technical, administrative, financial, and economic practices, and in accordance with the duties and responsibilities assigned to him. The Engineer shall perform all duties and tasks to ensure that the best construction practices are followed and that the deliverables are completed within the allocated Budgets and Construction Delivery Periods, and are in all respect equal to or better than the minimum specified, at the most economic costs, and is executed in full compliance with the Contract Documents.

The basic Engineer's supervision tasks envisaged for the project shall include, but not be limited to, the following (not a limitative list):

a- Review the detailed design and tender documents and confirmation of satisfactory deliverance of required construction details;

b- Ensure that all documentation for land expropriation has been processed;

c- Ensure that the Contractors protect antiquities affected by construction works as detailed in the ESMP;

d- Prepare any further clarifications to the design or drawings necessary for the Contractors to be able to carry out the construction works;

e- Examine and approve the construction program proposed by the Contractors and ensure systematic and periodic feedback and the regular updating of the construction program and resource allocations;

f- Review and assist where needed, and approve the Contractors' proposals related to materials, equipment and methods of construction and advise the CDR accordingly;

g- Review all the submittals from the Contractors including, but not limited to materials, shop drawings, organization plans, program and planning schedule(s) etc. ensuring that the mentioned meet the Contract specifications and CDR requirements;

h- Review and approve the design works carried by the Contractors;

i- Coordinate with other consultants and other authorities with respect to existing services relocation, temporary arrangements, traffic diversion, and infrastructure works in the project area;

j- Examine and approve the relevant Shop Drawings submitted by the Contractors or any other parties as the work progresses;

k- Ensure the satisfactory execution of the Works and timely completion of the same within the planned delivery period and the contract budget, in accordance with the contractual specifications;

l- Approve or comment on materials supplied by outside suppliers for incorporation into the works and arrange for any independent tests deemed necessary to ensure compliance with the specifications;

m- Ensure implementation of safety aspects

n- Identify emergency and safety works, and report such cases when needed for fast action;

o- Document all executed works with Digital Photos and Video Images and submit copies to the CDR;

p- Ensure the topographical and geographical data integrity of the entire works;

q- Provide Head Office Engineering and Project Management Services during Construction;

r- Supervise Tests at Completion and Performance Tests, and commissioning of the works substantially completed under the project requirements;

s- Assess any design modifications that may become necessary during construction, and propose technically acceptable amendments;

t- Monitor construction methods and operations to ensure compliance with the contract documents (drawings and specifications);

u- Monitor construction progress to ensure compliance with the agreed construction schedules and propose mitigation measures;

v- Ensure that the Contractors submit all necessary documents such as drawing and material submittals, inspection requests and progress reports, etc, for the Engineer's approval and monitor the availability of resources, materials and plants and identify any shortage or shortcomings;

w- Ensure that the daily progress of the works on site is maintained, and prepare daily reports (in an approved format) describing the ongoing activities, allocated personnel, work accomplished, resources, shortfalls, deliveries, inspection, survey checks, testing, instructions issued, visits by others, weather conditions etc.. and all other events of significance occurring during the day. Using these records, supplemented by field measurements, monthly calculations of quantities of work accomplished by the Contractors shall be compiled as a basis for assessing periodic payments;

x- Maintain information relevant to progress, performance, quality, quantity, resources and cost. This information shall be used in preparing monthly, final measurements, and payment certificates as well as periodic reports;

y- Prepare supervision reports, (as indicated below under the reporting requirements) on works carried out by the Contractors and highlight problems, obstacles, shortcomings and recommendations. The reports shall include information on progress, performance, measurements, quality control, cost data, contractual matters, materials, resources, manpower, weather conditions, variation orders, and Head Office staff inputs and site visits. The reports shall also include selected photographs showing various aspects of the works;

z- Measure the Works as they proceed, review and process Contractors' monthly payments, based on the measurements of substantially completed works, bearing in mind the results of inspections and testing;

aa- Perform quality control and quality assurance activities, follow up and evaluation;

bb- Reject sub-standard work and document any material or test not in compliance with the contract documents;

cc- Prepare and submit periodic financial reports, including update of the construction cost and cash-flow projections to assist the CDR in budget planning and control. Financial reporting procedures and format shall match the requirements of the CDR;

dd- Progressively checking and ensuring finalization of Contractors' As-built Drawings and Records for fully completed sections the works;

ee- Advise the CDR on contractual issues as well as matters related to policy, programming and cost control;

ff- Record, appraise and advise the CDR on any claim raised by the Contractors;

gg- Assist the CDR to amicably resolve the disputes that may arise with the Contractors;

hh- Report and forward recommendations for claims that cannot, in the opinion of the Engineer, be settled under the contract;

ii- Assist the CDR in disputes that are referred to the Dispute Board until issuing the final decision;

jj- Settlement of the Contractors' accounts, taking measurements and carrying out whatever deemed necessary in this respect in case of termination by the CDR of the Contractors' Contract before completion of the works;

3.4.4. Basic supervision tasks during Defects Liability Period

The Engineer shall be actively engaged in the commissioning and testing, including but not limited to providing assistance in the following:

- Approve the as-built drawings initially prepared by the Contractors at the end of construction;
- Approve Operation & Maintenance manuals initially prepared by the Contractors at the end of construction;
- Supervising the commissioning of all equipment, structures and plants;
- Preparing and submitting to CDR inspection and test reports and certificates of acceptance.

The Engineer shall observe that the correction of defected works is satisfactory during the Defect Liability Period. The Engineer shall provide necessary resources so as defects are detected as early as possible and corrections are realized on time by the Contractors, continuous reporting is expected during this stage.

3.4.5. Basic supervision tasks during Operation & Maintenance Period

The Engineer shall supervise and inspect the operation and maintenance works including, but not limited to the following activities:

- Supervising and inspecting the operation and maintenance works of the Contractors/Operators and material/components/parts supplied during the lifetime of the Service Contract to ensure completion in accordance to the provisions of the Contract;
- Monitoring environmental and health and safety requirements, whether specified or not, and ensuring that requirements are fulfilled;
- Taking photographs during operation and maintenance works, particularly on-site repairs, and keeping a daily diary of such activities;
- Supervising all on-site tests carried out by the Contractors/Operators;
- Supervising and preparing evaluation of all measurements made by the Contractors/Operators, including all on-site testing of mechanical, electro-mechanical and electronic measuring instruments;
- Audit and evaluate laboratory tests, and ensure that results of such tests, particularly those relating to chemical, biological and bacteriological tests of potable water, are within the safe health limits imposed by the Government of Lebanon;
- Ensure that the laboratories that issue all results of chemical, biological and bacteriological tests of potable water are certified to issue such results, and that such certification is recognized in Lebanon;
- Preparing and submitting inspection and test reports to CDR;
- Follow up on the procurement of spare parts to ensure their compliance with the specifications, including the monitoring of certificates of origin, and oversee their delivery on time;

- Promoting a good working environment and monitoring of labor relations, living and community relations to be able to identify potential problems and solve them promptly;
- Enforcing the Safety, Health and Environmental Regulations, and other Government of Lebanon regulations
- Ensuring that the Contractors/Operators complies with the services Contract in respect of insurance;
- Ensure that the Contractors/Operator have put in place a comprehensive water quality and quantity monitoring program, including routine flow monitoring, sampling and laboratory analysis, the Engineer shall audit the above program at monthly or random intervals, to ensure their validity;
- Verifying the validity of the Contractors/Operator's regular progress reports, asset management reports, and condition assessment reports;
- Verifying that the Contractors/Operator are meeting the performance criteria/parameters/standards as set in the O&M Services Contract;
- Monitoring the performance and supervise the Contractors/Operators' operations and maintenance program;
- Monitor the testing of the incoming raw water and treated effluent including the testing of effectiveness of individual process units;
- Reviewing the preventative maintenance plan to be put in place by the Contractors/Operators as part of the DBO contracts;
- Monitoring the maintenance program;
- Auditing Operations and Maintenance performance and supervising training of O&M Authority's staff.

3.4.6. Record or Log of Operation and Maintenance Works

The Engineer shall be responsible for ensuring that the Contractors/Operators maintain at all times a complete day-by-day record or log of the operation and maintenance works. To this end, the Engineer must ensure that the Contractors/Operators shall:

- Keep and maintain a comprehensive daily log of operation and maintenance work performed in relation to civil, electro-mechanical, electronic, and all other relevant installations within the remit of the Service Contract;
- Keep and maintain a complete and updated record of any periodic maintenance and/or overhaul programs for all or parts/components of the system being operated by the Contractors/Operators;
- Keep and maintain a comprehensive operation log for all or parts/components being operated by the Contractors/Operators, in particular electro-mechanical devices;
- Keep and maintain a complete and fully updated record of consumables used;
- Keep and maintain complete and fully updated records of all tests undertaken by the Contractors/Operators.

The Contractors/Operators must keep the above records or logs, in both paper and electronic form. In addition, the Contractors/Operators must incorporate the above records and logs in monthly reports that shall be submitted to both CDR and the Engineer.

The Engineer shall audit on a monthly basis, and maintain audit records for review by CDR and the respective O&M Authority, the Contractors/Operators' performance in producing the above mentioned records, logs and reports.

3.5. Planning and Co-Ordination

3.5.1. Preparation of Detailed Program

The Engineer shall prepare, and submit to CDR for approval, a detailed work plan including his methodology for ensuring the quality of the works, and a computerized program of all activities and resources for the execution of the works included in this contract. The Engineer's plan and program shall include all activities that interface or otherwise relate to the works being done by the different Contractors or other involved parties, including required dates of receipt of data and construction drawings, submittal dates for the various documents, appropriate periods for review etc.

The program shall be prepared using project management software such as Primavera or similar compatible software approved by CDR and shall be constantly updated throughout the period of the contract.

The initial work plan and program shall be submitted within the first two weeks after appointment and any required modifications shall be completed within two weeks of comment by CDR. Delay in receipt of some details from Contractors will not be accepted as valid reason for delay in submission of the Engineer's initial or updated program.

3.5.2. Progress Monitoring

The Engineer shall monitor the Contractors' works to determine progress on a monthly basis and ensure that the construction program is maintained and costs minimized by means of, but not limited to, the following activities:

- Review and, if in agreement, consent to the Contractors' proposed program of work to meet key dates established in the various contracts;
- Prepare and maintain progress programs for comparison against the agreed "baseline" program in order to monitor and report on progress;
- Analyze the variations of construction progress from the Contractors' program;
- If and when progress falls behind program, develop in consultation with the Contractors, for approval by CDR, appropriate modifications to programs and/or work methods to recover the original program.
- Ensure that the Contractors' reporting requirements identified in management procedures are adhered to.

3.5.3. Liaison and Coordination

The Engineer shall organize coordination and site meetings with concerned Contractors and suppliers on a regular basis and as necessary. The Engineer shall conduct these meetings on behalf of CDR, take minutes, and report to all concerned parties. Engineer will provide advance notice to CDR in order to facilitate participation in the meetings.

The Engineer shall liaise with the MOEW, LRA, BMLWE, EDL and other electricity and water authorities to ensure that all necessary measures are made and properly processed by the Contractors. This will require, but shall not be limited to, coordination with the concerned authorities with respect to: existing services temporary use and/or relocations, temporary arrangements deemed necessary for the project implementation, etc... And other temporary infrastructure works deemed necessary to be completed in the project area.

3.6. Verification and Approval of Contractors' Construction Documents

The services to be provided by the Engineer in this respect shall include, but shall not be limited to the following:

- *Review and recommend for approval the detailed design and drawings submitted by the Contractors*
- *Review and recommend for approval the working drawings and construction designs*
- *Review and recommend for approval the Contractors' work statements/methodologies, material and equipment sources, quality of material and equipment, testing of construction materials, testing of key equipment of water and wastewater treatment plants, to ensure the conformability to the specifications, safety, and performance requirements*

The Engineer site supervision teams shall review and check all construction documents covering the temporary and permanent works including: site access roads and bridging, excavations, waste water treatment plants and networks works. This review shall check for:

- Compliance with contractual requirements and applicable laws,
- Adherence to codes and standards,
- Technical correctness and completeness,
- Reliability, operability (ease of operation), durability (service life) and maintainability (ease of maintenance).

The Engineer shall review all Contractors' submittals and advise the Contractors of any need to modify or revise them. Such submittals will include:

- Design reports/descriptions
- Construction methods
- Technical requirements
- Operational rules and regulations
- Construction drawings
- Bills of quantities
- Conformance with contract requirements
- Technical standards
- Layout and sequencing d r a w i n g s for construction and installation of the project components
- Detailed concrete outlines and bar placement
- Manhole/access chambers schedules, layouts, and details
- Sequences of concrete placement
- Arrangements of concrete joints and waterstops
- Details of electro-mechanical works
- Details of structural steel work
- Architectural and embedded metalwork
- Slope stabilization and general protective and safety provisions
- Schedules showing detailed programming and sequencing of general and

specific construction activities
- Detailed piping, drainage, wiring and duct schedules
- Detailed finishing and landscaping drawings.

The Engineer shall develop a schedule of deliverables to be provided by each Contractor and formulate clearance procedures for monitoring and updating drawings as the work progresses. The Engineer shall ensure that the clearance procedures will alleviate the Contractors of their responsibilities to provide works that are fit for purpose and compliant with contract requirements. The Engineer shall adopt a design/document review and clearance system used on "best practice" projects and submit to CDR for approval.

3.7. Review and Monitor Contractors' Construction, Equipment Supply, Installation and Commissioning Programs and Activities

The services to be provided by the Engineer in this respect shall include, but shall not be limited to the following:

- *Review and recommend for approval the Contractors' construction planning and programs, and monitor construction progress for early detection of potential delays*
- *Prepare consolidated construction programs showing interfaces between different construction contracts, and between civil and mechanical/electrical works*
- *Ensure compatibility between civil and mechanical/electrical works*
- *Coordinate civil work activities between Contractors to prevent delays and disruption and avoid claims by Contractors*

The Engineer site supervision teams shall review, monitor and comment on all Contractors' construction equipment supply, installation and commissioning programs, and activities including but not limited to:

- Contractors' site management team, construction experience, management capability, manpower, and mobilization plan.
- Contractors' material mobilization plan.
- Contractors' construction progress plan and milestone plan, etc.
- Contractors' construction technical measures and operation rules and regulations.
- Contractors' construction procedure and construction methods.

3.7.1. Construction Programs

The Engineer team shall review the Contractors' construction schedules and the erection milestones, concentrating on critical path activities. This will entail a review of the "early start/early finish" and "late start/late finish" dates of the main construction activities to see whether they are reasonable. The amount of float for major works not on the critical path will also be reviewed in order to identify potential bottlenecks. Any anomalies in the critical path shall be pinpointed and made known to

the CDR. In analyzing the critical paths, the Engineer shall carry out risk analysis and identify the activities which could significantly affect the financial performance of the project. The Engineer shall focus on these activities, and determine and discuss risk reducing measures with the CDR and the Contractors. It is important that, in parallel with the technical activities, the Construction Schedule also shows the time-scale for the implementation of the defined environmental and social mitigation measures as defined in the ESMP and ESIA.

3.7.2. Equipment Supply Programs

In conjunction with the construction schedule, the Engineer site team shall review programs for the delivery of major equipment for consistency with respect to the timing of other design and construction activities. The production of construction drawings by the Contractors shall be coordinated with the fixed target dates for the design data inputs from the manufacturers' side. As major equipment will presumably be supplied by different manufacturers, it is important that interfaces are clearly defined and that the work of the different manufacturers is properly coordinated.

3.7.3. Integrated Construction Program

The Engineer shall prepare an Integrated Construction Program comprising the program prepared by the Contractors for the Project.

The Integrated Program shall include all the activities involved for completion of the Project as defined in the scope of the contract packages, if any. This shall be made at the beginning of the assignment and subsequently revised to include agreed schedules with various Contractors. Contract progress, both actual and financial, will be tracked. The Integrated Construction Program will facilitate:

- Identification of all activities falling on the critical path of the Project,
- Identification of all activities requiring close co-ordination/synchronization,
- Preparation of at a glance plan for the Project and time-to-time updating to monitor instantaneous status
- Generation of all Project-monitoring reports for the Project drawing attention towards critical jobs, activities and functions,
- Identification of all activities/steps required for execution of the Project within approved cost,
- Identification of all activities/steps required for execution of the Project within stipulated time,
- Highlight delays and suggest mid-course correction for timely and efficient execution of the Project,
- Monitoring of Contractors' logistics for sufficiency of Construction Equipment
- Assist CDR in developing optimum strategies for overcoming delays, if any, with innovative construction methods.
- Generation of MIS reports for the Project, and identify critical path on fortnightly basis.
- Providing all inputs/ performing all Project monitoring activities as desired by CDR from time to time for timely completion of the Project.

- Co-ordination for carrying out quality audits of Contractors and review / recommend for approval of corrective actions after suitable identification of the root causes of the problems encountered during construction activities.

3.8. Quality Control of the Works

The services to be provided by the Engineer in this respect shall include, but shall not be limited to the following:

- *Establishing a Quality Assurance Program applicable to the Project and to the approval of the CDR*
- *Monitoring of quality control and the application of the quality assurance program*
- *Supervising the civil and electro/mechanical works of the Project to ensure that the works are carried out in accordance with the design and specifications, and that the quality meets the required standards and specifications;*

The quality management system shall include all work undertaken by the Contractors. The system shall be developed so that the possibility of rework being required will be minimized. Project items shall be divided into logical units to allow rational quality control procedures that will ensure quality while allowing the work to proceed without delay. Quality issues shall be addressed as they arise and mitigation options will be developed which may include, as a last resort, rework.

3.9. Review of Contractors' Claims (Payment and Variations)

The services to be provided by the Engineer in this respect shall include, but shall not be limited to the following:

- *Inspect and control quantity of works, check completed works and issue temporary certificates for progress payments. Supervise progress of construction works and certify progress payments for completed works;*
- *Review and assess the Contractors and suppliers claims on additional works, extension of time and additional payment requests and make recommendations to the CDR*
- *Issue of instructions and variation orders to the Contractors in due consultation with the CDR*
- *After completion of each of the Project's components, and the Project as a whole, prepare reports evaluating quantities, quality and cost of completed works by the Contractors and suppliers in accordance with the contracts;*

3.9.1. Payment Claims

At the commencement of the Services, the Engineer shall discuss with the CDR the procedural details and documentation to enable payment requests of the Contractors to be processed and paid. The Engineer shall advise the Contractors on standards and formats for the Interim and Final Payment Certificates, on the documentation required in their support, and on the procedures for compiling the information. Payment procedure

by the CDR can be made sometimes in the form of payments made directly by the IDB upon approval and authorization of the invoice by the CDR.

The Engineer site team shall monitor and record the works through daily, weekly, and monthly reports on the Contractors' activities. All reports shall be carefully retained and filed for future reference in the event of claims by the Contractors. The site team shall also review all claims for progress payments received from the Contractors and assist the CDR with the approval / certification of payments.

3.9.2. Variations in conditions and claims for Extras

The essential part in the prevention of disputes is effective monitoring of Contractors' operations on site and the maintenance of accurate and detailed site records. It is very important that the supervision team maintains a clear picture of Contractors' work methods, and of changes in conditions necessitating changes in plant or equipment, and keeps a general overview record in a concise form for later reference. At the start of construction, the Engineer shall assist the Contractors in preparing record forms for the site supervision team to use, and in establish the site diary format for recording general events. Forms for instructions issued in the field will also be prepared. The information contained in all these will be used to monitor and process both claims and variation orders.

On receipt of approval from the CDR for a change in Contractors' scope of work, the Engineer shall seek a quotation from the Contractors for the work and, after negotiation, this agreed price will be passed to the CDR for approval. Upon approval, the CDR will issue a variation order for the work to the Contractors.

In the case of claims, the Contractors are required to formally notify both the CDR and the Engineer that they believe they have reason for a claim and the relevant circumstances leading to it. On receipt of this notification, the Engineer shall advise the CDR on procedures for its review and settlement. It is the intention of the Engineer to take all steps necessary to avoid potential claim situations, and he shall keep the CDR informed of this actions at all times and discuss possible remedial measures with them. In the event that the Contractors proceed with a formal claim, the Engineer shall review and analyze the claim and make recommendations and advise the CDR for its resolution. It is generally in the interest of both parties to deal expeditiously with the claim as soon as the causes are identified. Failure to do so can create an atmosphere of uncertainty for both sides that will prejudice the progress of the project. The Engineer shall evaluate any dispute and differences submitted to him and arising between the CDR and the Contractors and will give recommendations for settling.

3.10. Cost Control

3.10.1. Monitoring Contract Costs

The Engineer shall be responsible for monitoring of contract costs relative to budget. He shall utilize a computerized Budget and Cost Forecast (BCF) system and shall prepare, with the Contractors, an estimate of the cost of the various contracts, and incorporate updated quantities, variation orders, dayworks, potential costs of claims, and projected expenditure from provisional sums. The estimated cash flow up to completion of the contracts shall be prepared, updated based on the revised contract costs and submitted each month in line with the management procedures.

3.10.2. Claims Management and Variation Orders

The Engineer shall anticipate potential claims and shall take steps to mitigate their effect. The Engineer shall assess the need for variations to the contract and any claims submitted by the Contractors, review their merit and, where appropriate, prepare variation order requests and submit them to CDR for approval prior to preparing variation orders and issuing them to the Contractors.

The Engineer shall process in a timely manner and, as appropriate, certify for payment the Contractors' monthly statements to ensure that such statements reflect works completed.
The statements shall be based on measurements on site. The measurements on site shall be made jointly by the Contractors and the Engineer.

3.10.3. Cost Updating

At intervals of not more than 3 months, the Engineer shall prepare estimates of quantities required to complete the works under bill of quantity items and taking account of variations. He shall also estimate the time required to complete the works and notify CDR of any potential delays and shall propose measures to recover time lost.

3.11. Health and Safety

The services to be provided by the Engineer in this respect shall include, but shall not be limited to the following:

- *Supervise Safety during Construction and Installation*

In line with current international practice, the CDR assumes that the Contractors will be required to prepare a Health and Safety Plan, as part of his Quality Assurance Plan, in line with the WB/IFC Environmental Health and Safety Guidelines and the ESIS/ESMP requirements.

It is each Contractor's responsibility to prepare and implement a Health and Safety plan on the site. The primary aim is to avoid injury or Damage to Health to any of the Contractors' staff or persons associated with the construction activities, or to the general public.

The CDR requires that Contractors prepare and implement appropriate and effective Health and Safety provisions. The Engineer shall work with the CDR to review the Health and Safety Plan produced by the Contractors, in respect to the applied WB/IFC abovementioned guidelines. The review work shall focus on:

- Current legislation and codes of practice.
- The Contractors' capability in terms of health and safety.
- The Contractors' procedures for health and safety, and hazard identification.
- The Contractors' health and safety training (safety induction).
- Identification and elimination / minimization of hazards.
- The Contractors' compliance with safety rules.
- The Contractors' safety co-ordination.

- The Contractors' health and safety implementation documentation.
- Corrective actions and improvement requests.
- That new safety and health initiatives are implemented as appropriate

3.12. Supervision of implementation of Environmental and Social Management Plan

As part of the WSAP, a general ESMP was prepared to cover the various environmental and social aspects with regard to each component of the project. For the WWNTS component, a specifically defined ESMP was prepared by the design consultant based on his Environmental and Social Impact Assessment (ESIA) study.

The Engineer shall control the implementation of the Project Environmental and Social Management Plan (ESMP) and give instructions thereon to the Contractors.

The ESMP shall cover the main impacts and control measures including those identified in the Environmental and Social Impact Assessment (ESIA) study, in particular:

- Mitigation measures to be implemented during the construction and operation phase
- References to Control Guidelines and Standards;
- Responsibilities for the Implementation of the Plan;
- Verification, Monitoring and Training requirements (Capacity Building);
- Reporting, Record Keeping and Documentation Requirements.

The services to be provided by the Engineer in this respect shall include, but shall not be limited to the following:

- *Assist the CDR in setting up procedures for monitoring the compliance by the Contractors to the ESMP requirements;*
- *Prepare detailed program for implementing the ESMP during construction which includes the following aspects:*
    - *Environment properties that required supervision, work under supervision and monitoring frequency,*
    - *Assist the CDR in monitoring the specific aspects as outlined in the ESMP,*
    - *Detail of mitigation measures applied during Project implementation,*
    - *Regular report and final reports on environment for impact assessment Raise comments*
- *Review regular report made by third party monitoring agency (Environmental Panel and ESMP Supervision consultant) and assist the CDR to perform necessary measures to comments and recommendation indicated in these reports;*
- *Prepare regular reports for the CDR on the progress in implementing the ESMP*
- *Coordinate with the CDR and local authorities and Contractors to*

minimize adverse impacts on social and natural environment issues, address them as required.

3.12.1. Overall Approach

The project in its entirety is being implemented as per the World Bank's Safeguards policies and procedures. The overall objectives of the ESMP are: (i) to ensure the Project's compliance with Lebanese legislation and CDR's requirements; (ii) to provide a basis to carry out monitoring activities and compliance inspection programs; and (iii) to support the Contractors, CDR and relevant stakeholders in the implementation of mitigation and monitoring plans. In addition, the ESMP shall identify additional measures to be implemented during the operation phase of the project. The ESMP may be revised and modified throughout the Project lifetime.

The Engineer shall be in charge of ensuring the preparation (by the Contractors) and reviewing the Construction Environmental and Social Management Plan (CESMP) that points-out the means that the Contractors shall use for the implementation of the provisions of the ESMP. This will comprise identifying the potential environmental impacts generated by the project activities, coordinate and oversee the implementation of the relevant mitigation measures. The Engineer shall be also in charge of coordination, monitoring and supervision on the implementation of the RAP, mainly related to land acquisition and relevant resettlement activities.

As part of the overseeing the implementation of the ESMP, the Engineer shall be in charge of assigning the qualified personnel to, liaise and coordinate with the third party ESMP supervision consultant/E&S panel of Experts, monitor, appraise and instruct accordingly over a series of environmental variables / parameters. The parameters to be monitored during construction will include:

- Traffic flow
- Ambient air quality
- Ambient noise level
- Surface and groundwater quality
- Solid and liquid waste generation
- Health & Safety
- Hygiene
- Emergency plan(s)
- Archaeology
- Biodiversity
- Quarries
- Capacity Building and Trainings

The Engineer's team shall comprise an Environmental & Social Specialist to undertake its specific responsibilities in respect of supervising the Environmental and Social Management Plan (ESMP) of the project during the pre and post construction phase. From the outset, the Engineer shall build a functional capacity to facilitate effective implementation of the ESMP by Contractors and sub-Contractors through ensuring compliance with all environmental safeguard requirements with minimal impacts and delays to the construction program. The detailed ESMP prepared for the project shall comprise a number of major environmental management sub-plans

to be implemented during the construction phase. Key ESMP supervision tasks are described in more detail below.

3.12.2. Assist in Establishing Procedures for Monitoring ESMP Implementation

Establishment of procedures for monitoring ESMP implementation at the commencement of construction activities is critical for effective implementation of ESMP by the Contractors. These procedures will send a clear indication to the Contractors as to the importance of effective environmental management of construction activities and how contractual compliance to environmental mitigation requirements will be monitored throughout the construction period.

During the project inception phase, the supervision team shall review the ESMP, including its relevant sub-plans, and establish standard procedures for monitoring the ESMP implementation throughout the construction phase. This shall involve discussions with the Environmental & Social Specialist and close coordination with the construction supervision Team Leader such that the ESMP monitoring procedures are integrated into the overall Quality Assurance System and program. For example, templates for Contractors Construction Method Statements (CMS) will include the need for the Contractors to specify methods proposed to implement Environmental mitigation requirements as specified in the construction contract. Furthermore, approval of CMS shall be subject to review by the Engineer's project environmental officer or delegated authority. The planning by the Contractors for effective environmental mitigation shall be specifically addressed for specific works activities. Through the CMS review process, the Engineer shall assist the Contractors in identifying practical and effective mitigation measures to meet the ESMP requirements.

Other procedures to be established during the inception stage include: i) the scheduling and protocols for routine site inspections to check on implementation and effectiveness of the Contractors' mitigation measures', ii) inspection of the Contractors' environmental management activities and records; iii) communication protocols regarding the issuance of environmental noncompliance and corrective action notices to the Contractors including follow-up actions; iv) record keeping of daily environmental supervision activities and documentation of ESMP; v) reporting requirements and vi) coordination with Ministry of Environment.

3.12.3. Prepare Detailed Program for Implementing ESMP during Construction

Immediately following establishment of the ESMP monitoring procedures described above, the Engineer's Environmental & Social Specialist shall prepare a detailed program for implementing the ESMP during construction, in line with the recommendations given by the ESMP supervisor thereon. The Engineer shall plan the environmental supervision program in close coordination with the construction program applying the procedures and protocols established in the task described above. In this regard, the Engineer shall establish a detailed three month rolling program that will be updated monthly to correspond with the actual works program. This will allow for flexibility to ensure that environmental monitoring and supervision resources remain focused on the current construction activities and take account of any changes to the construction program that may arise. The detailed

rolling program for environmental supervision shall be developed within the context of the full construction environmental supervision program.

The primary focus of the environmental supervision program involves supervision of three elements of the Environmental and Social Management Plan (ESMP) presented into the ESIA: (i) Environmental and Social Impact Mitigation, (ii) Environmental and Social Monitoring, and (iii) Institutional Strengthening/Capacity Building.

The essential component of environmental supervision includes monitoring of the Contractors' activities to ensure that: i) the Construction Environmental and Social Management Plan (CESMP) including its associated sub-plans, are prepared by the Contractors in accordance with the construction contract and ESIA/ESMP requirements; ii) the CESMP is implemented by the Contractors in accordance with the requirements of the contract and ESIA/ESMP, and is effective; and iii) non compliances to contractual environmental requirements are identified at an early stage and corrective actions implemented in a timely manner to reduce construction related environmental impacts to acceptable levels.

Monitoring methodology will comprise: i) checking the completeness of the CESMP against the ESIA/ESMP requirements; ii) systematic visual inspection of the Contractors' works to verify or otherwise, the effective implementation of the CESMP including all contractual mitigation measures. This shall involve the use of site inspection checklists prepared during the inception stage, and photographs to document key issues of concern; and iii) sampling and testing of environmental parameters (where necessary) to verify effectiveness or otherwise of environmental mitigation measures.
The detailed program shall specify the scope, content and frequency of various environmental supervision progress reports to be issued by the EU team. The Engineer shall discuss and agree on the various reporting requirements with the CDR. The Engineer shall establish specific report formats for the various reports required so as to provide concise and relevant information focusing on key issues of concern and recommendations for time-bound corrective actions where necessary.

3.12.4. ESHS Monitoring

The Engineer shall ensure that the Contractors' ESHS performance is in accordance with good international industry practice and delivers the Contractor's ESHS obligations.

The ESHS related services include but are not limited to:

1. review and approve the Contractors' Environment and Social Management Plan (C-ESMP), including all updates and revisions (not less than once every 6 months);
2. review and approve ESHS provisions of method statements, implementation plans, GBV/SEA prevention and response action plan, drawings, proposals, schedules and all relevant Contractor's documents;
3. review and consider the ESHS risks and impacts of any design change proposals and advise if there are implications for compliance with ESIA, ESMP, consent/permits and other relevant project requirements;
4. undertake audits, supervisions and/or inspections of any sites where the Contractor is undertaking activities related to the Works, to verify the Contractor's compliance with ESHS requirements including its GBV/SEA obligations, with and without contractor and/or client relevant representatives, as necessary, but not less than once per month

5. undertake audits and inspections of Contractor's accident logs, community liaison records, monitoring findings and other ESHS related documentation, as necessary, to confirm the Contractor's compliance with ESHS requirements;
6. agree remedial action/s and their timeframe for implementation in the event of a noncompliance with the Contractor's ESHS obligations;
7. ensure appropriate representation at relevant meetings including site meetings, and progress meetings to discuss and agree appropriate actions to ensure compliance with ESHS obligations;
8. check that the Contractor's actual reporting (content and timeliness) is in accordance with the Contractor's contractual obligations;
9. review and critique, in a timely manner, the Contractor's ESHS documentation (including regular reports and incident reports) regarding the accuracy and efficacy of the documentation;
10. undertake liaison, from time to time and as necessary, with project stakeholders to identify and discuss any actual or potential ESHS issues;
11. establish and maintain a grievance redress mechanism including types of grievances to be recorded and how to protect confidentiality e.g of those reporting allegations of GBV/SEA.
12. ensure any GBV/SEA instances and complaints that come to the attention of the consultant are registered in the grievance redress mechanism

3.12.5. Review and Update of ESMP

The Engineer's Environmental & Social Specialist shall periodically, review, monitor and audit the effectiveness of the ESMP during the construction phase. The Engineer shall establish a routine ESMP review and audit system that takes account of the varying intensity of construction activities during the course of the construction period. At a minimum, the review of the ESMP shall take place annually but will also be undertaken following any significant non-compliance or in the case of any change required under a sub-plan or unforeseen change to the construction program. ESMP reviews shall consider: i) the adequacy of data collection, analysis and review; ii) reporting procedures; iii) non-compliances; and iv) corrective actions required.

3.13. Co-ordination with Authorities and Contractors

The Engineer's team shall provide a key coordination role between the CDR, MoEW, MoE, BMLWE, LRA and other local authorities and Contractors in regards to dealing with environmental issues including complaints investigation and resolution. Again, the Engineer approach in this regard shall be proactive by identifying potential issues before they occur and advising the various stakeholders of appropriate action to minimize impacts and facilitate the work program. It is recommended that routine (monthly) meetings are established with the concerned authorities to expose the construction progress information and provide a regular opportunity and forum for local authorities to raise issues of concern regarding project related activities.

3.14. Review Contractors' Submissions for Completion of the Works

The services to be provided by the Engineer in this respect shall include, but shall not be limited to the following:

- *Make recommendations for issue of partial and final taking-over certificates*

- *Review of the Contractors' and supplier's operation and maintenance manuals*
- *Check and recommend for approval of as-built drawings after completion of the works. List down all changes to the approved Technical Design or approved Working Drawings*
- *Check before acceptance of all works at different stages, parts and equipment and the Project as a whole on completion.*
- *Inspect of competed works and issue certificates of completion*
- *Inspect the works at appropriate intervals during the defects liability and O&M period and prepare the Defects Liability Certificate*

3.14.1. Partial and Final taking Over Certificates

When substantial completion has been achieved and commissioning tests have been carried out satisfactorily, the Engineer shall advise CDR on the issue of the respective Completion Certificate following such inspections and tests as are necessary prior to the issue of such certificates. Recommendations for release of retention money and final payments will be made after application by the Contractors at the appropriate times.

3.14.2. As-Built Drawings

The Engineer's site staff shall review all as-built drawings which will be prepared by the relevant Contractors. The Engineer shall ensure that Contractors prepare and issue as-built drawings for final review as each part or phase of the construction works are completed. As-built drawings shall include full, final and detailed layouts on CAD files and converted GIS formats.

3.14.3. Operations and Maintenance Plan

The Engineer shall review the Operation and Maintenance manuals prepared by each Contractor and coordinate with other consultants involved in the WSAP.

It is common practice for the electro-mechanical equipment manufacturers to provide O&M manuals and training during commissioning and first commercial operation. The Engineer shall review the O&M manuals and approve or comment as appropriate.

3.14.4. Acceptance of the Works

Contractors' method statements shall be reviewed by the Engineer before approval is granted. Should a deficiency in understanding be apparent, the Engineer shall arrange further meetings to address again the important issues in respect of the QA & QC requirements, etc.

On successfully completing each part of the works contract and commissioning the Project, the Engineer shall submit all specific contract Project-related documents and records to the CDR for future reference in accordance with standard international practice.

3.14.5. Defects Liability Period (DLP) and Operations and Maintenance (O&M) period

The Defects Liability Period shall be three hundred and sixty-five (365) days from the date of Completion of the Facilities (or any part thereof).

If during the Defects Liability Period any defect should be found in the design, engineering, materials and workmanship of the Works executed by the Contractors, the Contractors shall promptly, in consultation and agreement with CDR regarding appropriate remedying of the defects, and at its cost, repair, replace or otherwise make good as the Contractors shall determine at its discretion, such defect as well as any damage to the Facilities caused by such defect.

The Engineer's staff shall be available during the DLP and the Operations and Maintenance period to assist in resolving any technical difficulties encountered, and assist in negotiating repair of defects with the respective Contractors. Pro-forma inspection check-sheets reflecting the requirements of the contract/specifications will be prepared prior to the site inspections during this period, covering civil, mechanical and electrical aspects of the scheme. Once all inspections are complete, the Engineer shall compile a 'punch list' of items to be remedied, and will sign them off as they are completed. The final inspection would be carried out by a team of CDR including the officials from the taking over committee and the eventually appointed Authority (ies) for the O&M project.

3.15. Monitoring of WWNTS during O&M period.

Monthly reports should be submitted by the Contractors, including but not limited to diagrams showing the performance of the works, calculation of monthly penalties for non-compliance with the attainable criteria for the set parameters, times, duration, reason and remedying of emergency operation and outages, statistics of staff members and labor utilization, information on major equipment repair, spare parts used, health and safety issues, monthly expenditures.

3.16 Operations and Maintenance Training

In addition to providing Operation and Maintenance manuals, each Contractor will be required to conduct training in application of these O&M manuals.

The Engineer shall review the proposed training programs to ensure that they are suitable. It is anticipated that the trainings provided will include both formal and on-the-job training. Inspections of critical areas of the projects should be made so that staff will become familiar with the different aspects of each project.

4. REPORTING REQUIREMENTS

The Engineer shall prepare and submit the reports listed below. All reports shall be accompanied by an executive summary, reporting shall be in English. One original and two copies in color of each report shall be submitted to the CDR in addition to an electronic copy of the same.

All reports to be submitted to the CDR shall be addressed through an official cover letter to the CDR President, duly registered at the president secretary office, and copied to the CDR Projects Department / PMU Project Director / other relevant departments at the CDR. Original hand delivered attachments shall only be received by the PMU Project Director.

The outline and format of the required reports will be agreed on at the initiation of the project and will be followed out through the duration of the project, and may be amended as needed. However, the Engineer shall submit all his reports in accordance with the "Management Procedures Submissions from Consultants" issued by SIU, made available at the CDR.

The Engineer shall prepare all necessary reports for progress and record purposes. These shall include, but shall not be limited to, the following:

- Inception report
- Monthly reports[2] detailing progress of the works and the financial situation taking account of the Contractors' billings, with a summary of actual progress and tasks completed compared against the contract program;
- A report at the end of each phase of the works covering tests of equipment and installations, and recording issue of substantial and final completion certificates;
- At the completion of the Project, a final completion report covering the Contractors' final account and handover of works including as-built drawings;
- ESMP implementation report[3]
- Construction Supervision & Quality Assurance Safety Plan
- Instrumentation Plan
- Emergency Preparedness Plan
- Operation & Maintenance Plan
- Project Operations Manual

The preparation of these reports shall include, but not be limited to, the following activities:

- prepare and agree with CDR on appropriate formats and review these formats, if required, as works proceed;
- collect and check daily and shift reports from the Contractors in

[2] As per Section 4.2 below
[3] As per Section 3.12 below

anticipation of preparing weekly and monthly summary reports;

- keep records of all measurements and agreements, and incorporate measurement data in monthly progress reports and cost monitoring systems;
- undertake the correct and timely distribution of all reports;
- distribute minutes of site and co-ordination meetings within the three days following the meeting;

4.1. Inception Report

The Engineer shall submit the Inception Report within fourteen (14) days from the Contractors' notice to commence. This report shall include the approved project schedule; the Contractors' equipment and personnel mobilized for the project and the quality control and assurance procedures.

4.2. Monthly Progress Report

Monthly progress reports are standardized for all consultants to allow their incorporation in a single document grouping all components to be submitted to CDR and donor representatives. The Engineer shall follow these standardized formats made available at the CDR.

The Engineer will submit Monthly Progress Reports that shall include an executive summary showing work progress (Actual vs. Planned), budget expenditure, and a minimum of half a page of text describing progress, delays, pending issues, potential risks and mitigation measures and actions, etc. The Report shall include the following (not a limitative list):

a- A detailed description of the Engineer and Contractors activities, including comments and progress made in the shop drawings;

b- Summary program (Maximum of 2 pages for each site) along with a key plan showing areas under progress and type of works executed;

c- Construction progress reports showing planned and actual progress and a forecast of the work planned during the next month;

d- Summaries of expenditure incurred for construction and supervision services;

e- An update estimate of likely date of completion of the works and the likely final completion cost of the project;

f- List and copy of important Letters of Instructions and Variation Orders issued to date;

g- Contractors' and Engineer's staffing during the period;

h- Contractors' equipment used during the period;

i- Test results;

j- Permanent materials delivered and consumed during the period;

k- Video of critical activities, photographs, including photographs of items that will eventually become hidden. The Engineer will instruct the

Contractors to invite the Engineer to record such "hidden" items as the work progresses.

The Engineer shall prepare and/or supervise the preparation of cost reports, progress reports, construction schedules, estimates of monthly cash requirements, Contractors' estimates for payments, and such other reports and data as may be desirable or as may be directed by CDR. Monthly construction progress reporting will require the production of an Earned Value report, a tabular cash flow report with associated "S" curves and a comparison bar chart.

4.3. Monthly Financial Report

The Engineer shall submit a Monthly Financial Report. This report shall include update of the construction cost and cash flow projections to assist in budget planning and control.

4.4. As - Built Drawings and Completion Reports

The Engineer shall be responsible for ensuring that the Contractors maintain at all times on the site a complete set of the up-to-date shop-drawings (working drawings) for the contract. As the work proceeds, the Engineer shall be responsible as well for ensuring that the Contractors prepare and submit in 14 days following completion of the works (partially) the as-built drawings pertaining to these completed works. To this end, the Engineer shall ensure that the Contractors shall:

- on a set of working drawings, maintain a continuous reproducible as-built record of the actual alignments, levels, dimensions etc. to which the works have been constructed;
- on completion of the construction of each structure, transfer all recorded changes to a CAD file (original CAD files to be by designer), or prepare new CAD drawings as required;
- Prepare completion reports for all major structures or elements of the contract works, incorporating as-built records and drawings, within 60 days of issue of any taking over certificate. Completion reports shall also include details of construction methodology, test results, O&M recommendations etc.

The Engineer shall audit, on a monthly basis, the Contractors' performance in producing as-built details and completion reports, and shall maintain audit records for review by CDR.

4.5. Operation and Maintenance Manuals

The Engineer shall review detailed Operation and Maintenance manuals prepared by the Contractors, finalize as appropriate and submit to CDR.

5. ENGINEER'S PERSONNEL

5.1. Key Required Experts

The following Engineer's team is considered appropriate as a minimum. The Engineer shall make his own assessment of the staff needed for carrying out the work but must comprise at least the minimum key personnel specified hereinafter:

SN / Position		Area of Expertise / Experience and Qualifications	Tasks Assigned
1	Team Leader *(Position K1)*	Civil engineering, procurement, project management, site and construction supervision (Min: Engineering degree & 20 years of applied similar experience)	▪ Responsible for general and financial management of the Project, as well as liaison with CDR and Contractors; ▪ Responsible for ensuring that all reports and other outputs are delivered to the CDR according to the agreed time schedule; ▪ Responsible for ensuring the completion of the Project in accordance with the contractual provisions; ▪ Sets up the organization and manages the Project's team; ▪ Sets up Engineer's QA procedures for the Project; ▪ Reports on a regular basis to the CDR, local authorities, and communities ▪ Provide training activities to counterpart staff and or other consultants (if any)
2	Wastewater Treatment Specialist *(Position K2)*	Civil engineering/Mechanical engineering, Wastewater, commissioning, Supervision (Min: Engineering degree & 15 years of applied similar experience)	▪ Responsible for checking and supervising the design, supply, installation, testing and commissioning of the wastewater treatment plants ▪ Responsible for supervising the rehabilitation of existing wastewater treament plants ▪ Provide training activities to counterpart staff and or other consultants.
3	Hydraulic Specialist *(Position K3)*	Civil engineering/Mechanical engineering, Wastewater,	▪ Responsible for supervising the execution of wastewater networks, main collectors, and pumping stations ▪ Provide training activities to counterpart staff and or other consultants.

SN / Position		Area of Expertise / Experience and Qualifications	Tasks Assigned
		Supervision (Min: Engineering degree & 15 years of applied similar experience)	
4	Construction Supervision Engineer *(Position K4)*	Civil engineering, Construction Supervision, Technical Leadership, Project Management (Min: Engineering degree & 20 years of applied similar experience)	▪ Responsible for assisting the Team Leader in managing the Project as well as liaison with CDR and Contractors; ▪ Responsible for ensuring that all reports and other outputs are delivered to CDR according to the agreed time schedule; ▪ Responsible for ensuring the completion of the Project in accordance with the contractual provisions; ▪ Sets up the organization and manages the Project's team. ▪ Sets up Engineer's QA procedures for the Project; Reports on a regular basis to CDR, local authorities, and communities.
5	Procurement & Contract Expert	Knowledge of: IDB procurement applied processes, administration of FIDIC forms of contract, project management, applicable civil / institutional and other laws, etc… (Min: 15 years of applied similar experience)	▪ Undertake Contract Administration ▪ Keep track of implementation of contracts ▪ Assist Team Leader manage the contractual and commercial activities ▪ Reporting
6	Environmental & Social Specialist	Environmental and social safeguards assessment, ESIA, ESMP, RAP, etc… (Min: 15 years of applied similar experience)	▪ Responsible for environmental and social supervision during construction
7	Health and Safety Specialist	H&S Guidelines (Min: 15 years of applied similar experience)	▪ Responsible for Health & Safety supervision during construction ▪ Ensure that H&S guidelines are applied

SN / Position	Area of Expertise / Experience and Qualifications	Tasks Assigned
Other Staff: - Civil Engineers - Electro-Mechanical Engineers - Topographical Surveyors - Site Inspectors - Drafters	Construction supervision, quality control, site inspection, design, site logistics, MEP installations and commissioning, technical assistance, reporting etc…	▪ Assist the staff – each in his area of expertise – with checking and supervising the execution of works by the Contractors;

The Engineer shall provide the CVs of his proposed Key Experts in a responsive way to the required list shown above, and as per required Format, clearly noting the proposed position of the individual, with information about his/her education, international and professional experience, regional experience, years with firm, specific project-related experience and experience in similar posts. Proven Long Corporation or Employment of the personnel by the firm is a beneficial point. Submission of alternative personnel and substituting the proposed personnel are not allowed.

The Engineer shall also provide the personnel envisaged for the backstopping and office support staff, along with the project proposed organizational chart clearly stating tasks to be assigned for each of the main (above listed) and backup staff. The costs the backstopping and office support staff should be covered within the overhead of the Remunerations of the abovementioned key Experts. This shall allow a profound judgment on the consultants' general ability to provide the required personnel having the specific experience to monitor the team and provide backup services from the home office.

5.2. Staff-Months input

The Engineer shall employ such staff as may be necessary to fulfill his obligations under the agreement. The Engineer shall make his own assessment, based on the progress of the construction works, for the allocation / engagement of each member of the team necessary to fulfill his obligations. The staff introduced as full time shall be exclusively assigned to the project.

No member of the staff shall be mobilized or engaged within the team until the Engineer has received formal written approval for him/her.

The deployment of the above staff shall depend on the duration of the construction stage and as progress of works may warrant. The Engineer will be notified before the start of the Project and CDR will issue an Order to Commence.

Upon the CDR's approval of the staff allocation plan, the on-board Engineer's personnel are to be on a full time employment basis totally allocated to the project and are expected to work such hours as are necessary to carry out their duties. During site construction and installation works the Engineer shall ensure that his staff are on site at all times when the Contractors are working. No additional payment will be considered in respect of overtime.

In the event that not all 3 lots are simultaneously active, the Client reserves the right to request the Consultant to decrease the staff-hours to match the active lot(s) Supervision requirements.

5.3. Staffing Schedule and Staff- Month Forecast

In line with the above shown staff-months input, the Engineer is requested to submit, on a quarterly basis, the forecast of his staffing schedule that shows the allocation plan (anticipated input), indicated individually for each of the required staff, for the next quarter, no later than two weeks before its beginning. CDR's formal approval of this forecast for the staff input for the next quarter will be considered as the basis of the monthly remunerations during this period.

No member of the staff shall be mobilized or engaged within the team until the Engineer has received formal written approval for him/her.

The deployment of the above staff shall depend on the duration of the construction stage and as progress of works may warrant, however the overall estimated Man-Months for the supervision staff, on an indicative, is provided below as such:

SN / Position		Man-Months (From Start to Completion)	Man-Months (during O&M Period)
1	Team leader	4	2
2	Wastewater Treatment Specialist	12	3
3	Hydraulic Specialist	12	3
4	Construction Supervision Engineer	16	-
5	Procurement & Contract Expert	3	1
6	Environmental & Social Specialist	6	2
7	Health and Safety Specialist	4	2
	Other local supportive staff: - Civil Resident Engineers (no. 2) - Electro-Mechanical Engineers (no. 2) - Site Inspectors (no. 2) - Topographical Surveyors (no. 2) - Drafters (no. 2)	 2x16 2x6 2x16 2x3 2x3	 2x1 2x1 - - -
Total Man-Months		**145**	**17**

5.4. Principal Duties and Required Qualifications for the Key Staff

- **Team Leader**
  - Principal duties:

- Responsible for general and financial management of the Project, as well as liaison with CDR and Contractors;
- Responsible for ensuring that all reports and other outputs are delivered to CDR according to the agreed time schedule;
- Responsible for ensuring the completion of the Project in accordance with the contractual provisions;
- Sets up the organization and manages the Project's team;
- Sets up Engineer's QA procedures for the Project;
- Reports on a regular basis to CDR, local authorities, and communities
- Provide training activities to counterpart staff and or other consultants (if any)

- Minimum qualifications:
  - Civil Engineering Degree.
  - Membership of an appropriate international professional body.
  - 20 years of experience in similar projects.
  - Able to demonstrate expertise in procurement, project management, site and construction supervision.

- Languages: English is a must. Arabic and French are considered an asset.

▪ Wastewater Treatment Specialist

- Principal duties:
  - Responsible for checking and supervising the design, supply, installation, testing, and commissioning of the water and wastewater treatment plants
  - Responsible for supervising the rehabilitation of existing wastewater treatment plants
  - Provide training activities to counterpart staff and or other consultants (if any)

- Minimum qualifications:
  - Civil or Mechanical Engineering Degree.
  - Membership of an appropriate international professional body.
  - 15 years of experience in similar projects.
  - Able to demonstrate expertise in wastewater systems, commissioning, and supervision.

- Languages: English is a must. Arabic and French are considered an asset.

▪ Hydraulic Specialist

- Principal duties:
  - Responsible for supervising the execution of wastewater networks, main collectors, and pumping stations
  - Provide training activities to counterpart staff and or other consultants (if any)

- Minimum qualifications:
  - Civil or Mechanical Engineering Degree.
  - Membership of an appropriate international professional body.
  - 15 years of experience in similar projects.
  - Able to demonstrate expertise in wastewater systems and supervision.

- Languages: English is a must. Arabic and French are considered an asset.

▪ Construction Supervision Engineer

- Principal duties:
  - Responsible for assisting the Team Leader in managing the Project as well as liaison with CDR and Contractors
  - Responsible for ensuring that all reports and other outputs are delivered to CDR according to the agreed time schedule;
  - Responsible for ensuring the completion of the Project in accordance with the contractual provisions;
  - Sets up the organization and manages the Project's team.
  - Sets up Consultant's QA procedures for the Project;
  - Reports on a regular basis to CDR, local authorities, and communities.

- Minimum qualifications:
  - Civil Engineering Degree
  - Membership of an appropriate international professional body
  - 20 years of experience in similar projects
  - Able to demonstrate expertise in construction supervision, technical leadership, and project management

- Languages: Arabic and English are a must. French is considered an asset.

▪ Procurement & Contract Expert

- Principal duties:
  - Undertake contract administration
  - Keep track of implementation of contracts
  - Assist Team Leader in managing the contractual activities
  - Technology Transfer
  - Reporting

- Minimum qualifications:
  - 15 years of experience in similar projects
  - Able to demonstrate expertise in Islamic Development Bank procurement applied processes, administration of FIDIC forms of contract, project management, applicable civil/institutional and other laws.

- Languages: English is a must. French and Arabic are an asset.

▪ Environmental & Social Specialist

- Principal duties:
  - Responsible for environmental and social supervision during construction and operation
  - Provide training activities to counterpart staff and consultants

- Minimum qualifications:
  - 15 years of experience in similar projects
  - Able to demonstrate expertise in environmental and social safeguards assessment, ESIA, ESMP, RAP…

- Languages: English is a must. French and Arabic are an asset.

▪ Health & Safety Specialist

- Principal duties:
  - Responsible for Health & Safety supervision during construction and operation
  - Ensure that H&S guidelines are applied

- Minimum qualifications:
  - 15 years of experience in similar projects
  - Able to demonstrate expertise in Health & Safety guidelines

- Languages: English is a must. French and Arabic are an asset.

▪ Other Staff

- Civil Engineers
- Electro-Mechanical Engineers
- Topographical Surveyors
- Site Inspectors
- Drafters

Qualifications: ……. should have sufficient experience in construction supervision, quality control, site inspection, design, site logistics, MEP installations and commissioning, technical assistance, reporting…

Assist the staff – each in his area of expertise – with checking and supervising the execution of works by the Contractors;

ANNEX 1: SIU STANDARD PRACTICE DOCUMENTS:

(available on CD to be collected from CDR Tender Department)

- Management Procedure for Consultants
- Quality Assurance for Consultants
- SPD2- Health and Safety in Design
- SPD4- Mechanical Electrical and Instrumentation Systems
- SPD5-Water Transmission and Distribution Systems
- SPD6-Water Treatment
- SPD7-Water Pumping Stations
- CDR Safety, Health and Environment Regulations
- Environmental, Health & Safety Guidelines of the World Bank (www.ifc.org/ehsguidelines)

ANNEX 2: GIS REQUIREMENTS: