Government of the People's Republic of Bangladesh
Office of the Executive Engineer
Motijheel PWD Division, Dhaka

Terms of Reference (for procurement package No: WD8/S-1):- Selection of Consulting Firm for providing Consultancy Services for the Geometric-Hydrauic Design, Sewerage Transmission, Air Supply System, Structural &Foundation Design of the proposed Sewerage Treatment Plant for Motijheel Govt. Colony of 4 nos 20-storied buildings.

A. Introduction

Bangladesh Government has undertaken several development projects to increase the number of accommodation for government employees. Honorable Prime Minister has also given kind direction to increase such facilities up to forty percent in Dhaka city from existing eight percent. Ministry of Housing and Public Works and Public Works Department have the utmost responsibility to implement Honorable PM's kind directives. Motijheel Govt. Colony is one of largest areas not only in Dhaka but also in Bangladesh where large number Govt. employees are residing in. As the buildings were constructed in the then East Pakistan period, accommodation condition has been severely deteriorated due to aging buildings. Public Works Department (PWD) has taken up a project titled as *Construction of Multistoried Residential Building at Motijheel Govt. Colony, Dhaka* to construct four 20-storied buildings with the view of replacing aging buildings with high-rise ones so that larger numbers of govt. employees may be accommodated within the same geographic space. The objective of the proposed consultancy services is to extend the sewerage services to households and ensure a sustainable environment friendly neighborhood.

B. Objective of the Assignment

The objective of this assignment is to design, supervise and monitoring the construction of a Sewerage Treatment Plant to be built at Motijheel Colony for under construction 4 no's 20 storied building which will have a total of 532 no residential flats. The consultant will have to provide code compliant design for the STP. Domestic sewage generated from the residential area will be treated through the proposed sewerage treatment plant. The specific objective would be, but not necessarily be limited, to

- Carry out a feasibility study and identify a suitable position for the Plant with the project premise.
- Carry out detailed design (Geometric-Hydraulic Design, Sewage Transmission, Air Supply System & Structural Design, Air-blowers, Air-diffusers, air-transmission tubing, mechanical stirrer, sewage transfer transfer pumps, sump pumps, coarse and fine mechanical self cleaning screens, sewage conveyance pipes etc.) and subsequently prepare estimates, bill of quantities, bidding documents.
- Supervise the construction works in accordance with the General and Particular conditions of Contract, the Technical Specification, Engineering Drawings or any amendments thereto;
- Ensure that works are constructed within contract price and time for completion allowed under the contract or any agreed amendment thereto.
- Performing on-field training or knowledge sharing with the PWD officials regarding STP design and construction.

C. Scope of the Assignment

Following the guidelines of BNBC/relevant International Codes, the Consultant shall carry out their tasks in accordance with accepted professional standards, utilizing sound engineering and economic practices. The Consultant shall deliver timely sound and diligent services. In conducting this work, the Consultant shall cooperate fully with Government officials related to the project who will provide the data and requirements; the Consultant shall be solely responsible, however, for the analysis and interpretation of all data received and for the conclusions and recommendations contained in their reports.

The basic elements of the proposed sewerages system and network are expected as

i). Design values to be considered as follows:

a) Total numbers of inmates
b) Maximum number of inmates
c) Per capita waste water generation

ii) The consultant has to find out the design waste water discharge. The fluidized homogeneous domestic sewage from all septic tanks will be transported to the STP. There will be equalization tank. Submersible pumps at deferent stages will be installed to discharge homogenized liquid. Effective procedure is to develop to remove large particles. Blowers may be used for continues aeration. Sedimentation basins may be design for settling of biomass following aeration. There may be provision for post treatment involving disinfection. The design of a tertiary treatment system through Bio-film Adsorption process of Biologically Treated & Settled Effluent prior to disposal should be developed.

The following is a description of the scope of work:

Design Phase:

- Review of relevant documents and design manuals including CAD drawings and building lay-outs and networks for designing the STP and its accessories.

- Design and layout of the septic tanks for each of the buildings inside the project area

- Conduct laboratory scale model studies with the collected sewage samples from the similar residential area to determine the optimum design parameters and criteria

- Determine the primary/fundamental design criteria/parameters of STP based on the maximum number of inhabitants and support staff, per capita sewage generation, sullage and peak flow conditions

- Develop the geometric and hydraulic design of the different unit operations/processes of the STP based on the Laboratory Scale Model study results. This laboratory scale model study is mandatory for optimum design option.

- Design the sewage transmission pipe network system from the septic tanks to the proposed STP based on the road network and the septic tanks lay-outs. This doesnot include the surface drainage system or the sewage collection network

- Design the STP's treated effluents safe disposal system and re-use facilities and make sure that treated effluents laboratory test result shall retain within the codal limits.

- Prepare the technical specifications as well as Engineer's estimates for the STP (civil construction part and the electro-mechanical units such as the Air-blowers, Air-diffusers, air-transmission tubing, mechanical stirrer, sewage transfer transfer pumps, sump pumps, coarse and fine mechanical self cleaning screens, sewage conveyance pipes etc.)

Construction Phase :

Performing Top supervision during laying out and construction of the newly designed Septic Tanks, sewage transmission lines from the septic tanks to the STP. With due diligence and efficiency supervise fully the construction of the works which are to be executed in accordance with sound technical administration, financial and economic practices. The consultant shall perform all duties associated with such tasks to ensure that only the best construction practice is followed and that the final product is in all respects equal to that specified, at the most economic costs and is executed in full compliance with the specifications. The scopes of work under this task include:

- Check that the contractor follows safe working practices in all operations and immediately draw attention to any instances where this policy is not followed, directing the contractor to carry out all such works deemed necessary in case of emergency/ affecting the safety of personnel, works and adjacent property;
- Ensure that the minimum impact is caused to the biodiversity, local community and the flow of traffic;
- Organize the supervision of the works contract with proper allocation of responsibilities to individual members of the supervision team and supervise their work in order to ensure that it is effectively executed;
- Establish a systematic construction procedure for different civil works set out in the specification following the GOB's environmental and social safeguards.
- Routinely inspect the Works both under construction and completed, for compliance with the Specifications and the agreed method of working, as a basis for payment;
- Review the Contractor's proposed working drawing/plans and associated calculations. Approve or reject the proposals accordingly and identify any changes required;
- Submit progress reports, special report (to fully acquaint the client with all aspects likely to affect the Technical and Financial implementation of the project), final reports and records, and other hard outputs regarding construction progress and the status of the Works Contract;
- Review, approve two full sets of as-built drawings submitted by contractors within one month of completion of the Works detailing all alignment and level information, position and sizes of drainage structures, services information,
- Establish a quality assurance system to ascertain the desired quality standards at all stages of the service.

C. Reporting Requirement

The following are the essential reporting requirement under the assignment:

- The Consultant shall submit and present an **inception report** within one week after signing the contract. The report shall outline the Consultant's initial findings and confirm the methodology and detailed work program proposed for adoption in the light of the initial findings, while also identifying constraints and proposed solutions, together with any action required by PWD to facilitate the successful implementation of the service.

- The consultant shall submit the draft **engineering design report** within four weeks of signing the contract. The report needs to be finalized within 7 days after receiving the comments from PWD.

- The consultant shall submit the **Engineering's estimate** within three days of finalizing the detailed drawing.

- The consultant will submit a completion report of the project after successful completion.

D. Duration of the Assignment

The assignment is expected to be carried out over a period of **06(Six) months**. (1(One) month for design phase 5(five) month for construction phase)

E. Expected Qualifications and Experience of key Professional Staff with Indicative Input

The assignment requires specialized technical input from a firm/a consortium of firms having in-depth experience at least 3 years in similar kind of work. All the Consultant's personnel shall be fluent in the full use (i.e. the writing, reading and speaking) of the contract language, which is English. In addition, all the key staff described herein, shall be fully computer literate regarding word processing and spread sheets, with at least one member of staff fully computer literate in the use of data bases and computer aided design and drafting (CADD). Only the key professional personnel will be evaluated.

The Consultant shall provide competent personnel for the services, who shall be managed by the Team Leader and who will represent the Consultant in performing the services. Qualifications and experiences of key professional staff are described in Annexure -A. The firms shall provide CVs of all key professional staff listed in Annexure-A; **only CVs of such key professional staff will be evaluated.**

G. Major Deliverables and mode of payment:

Sl.	STAGE	% of payment
1.0	Detail Geometric & Hydraulic Design of the proposed STP on the basis of previously obtained / determined Laboratory Scale Model investigation results / findings carried out on similar type of STP	**75%**
2.0	Preparation of Civil working Drawings through CAD operator (3 sets colour Laser print & 2 sets Black and white print).	
3.0	Preparation of Structural & Foundation Designs (3 sets colour Laser print & 2 sets Black and white print).	
4.0	Preparation of Technical Specifications for Sewage Transfer pumps, Sump Pumps, Air Blowers, Air Diffusers and piping systems for diffused Aeration process for Biological Sewage Treatment.	
5.0	Preparation of Bill of Quantities (BOQ) of civil works & Air supply (Diffused Aeration Systems) MS/PVC piping network systems.	
6.0	Design of modified Septic Tanks for domestic uses with ST effluent Collection Pits Design of Septic Tank Effluent Transmission/pumping system for smooth flow of Sewage to the proposed STP.	
7.0	Design of Tertiary Treatment System(Through Bio-film Adsorption process of Biologically Treated	
8.0	Preparation of Final Report including Operation and Maintenance Guide lines	
9.0	Supervision cost to oversee the adherence of approved design during construction phase and submission of completion report.	**25%**
	Total	100%

Annexure-A

Qualification and Experience Requirement of Key Professional Staff

Sl. No.	*Position*	*General Qualifications*		*Specific Expertise and Experience in project works relevant to the project*
		Minimum Educational Qualifications	*Minimum Years of Experience*	
1	Team Leader & STP Design Specialist	M.Sc. Engineering (Civil) or at least B.Sc. Engineering (Civil) or PhD in Civil or Environmental Engineering with proven record of designing of STP/WWTP is highly desirable	20	. Proven record on preparation of feasibility report, detailed design, extensive experience on geometric-hydraulic design of STP/WWTP Able to Conduct laboratory scale model studies with the collected sewage samples from the similar residential area to determine the optimum design parameters and criteria. Proficient in the design of Sewage Transfer pumps, Sump Pumps, Air Blowers, Air Diffusers and piping systems for diffused Aeration process for Biological Sewage Treatment.
2	Structural Engineer	Preferably M.Sc. Engineering (Civil Engineering) or at least B.Sc. in Engineering (Civil) with P Eng.	15	Preferably15 years' of experience in structural and foundation design. Proven record in design work of different infrastructure is the minimum requirement.
3	Electrical Engineer	B.Sc. in Engineering (Electrical engineering)	10	Proven record on design, installation & supervision of electro-mechanical equipment is desirable.
4	Quality assurance Engineer	B.Sc.in Engineering (Civil) with higher degree in project management and administration	10	Proven record on maintaining quality of works in large projects. Experienced in supervising and managing time bound project & also have proven record in completion of STP/WWTP project successfully.

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