

TERMS OF REFERENCE

TECHNICAL & ENGINEERING SPECIALIST (STRUCTURES)

KARACHI WATER & SEWERAGE SERVICES IMPROVEMENT PROJECT

1. Introduction

Karachi is Pakistan's largest city, main seaport and international trade hub. It encounters numerous challenges among which water supply and sewerage are the worst affected services, falling far short of the city's expanding needs. To mitigate this gap, develop these services for Karachi and strengthen the Karachi Water and Sewerage Corporation (KWSC) to become a financially viable and technically well performing water utility that ensures clean, safe drinking water and sewerage services to public, the Government of Sindh GoS / KWSC partnered with the World Bank Group through the Karachi Water and Sewerage Services Improvement Project (KWSSIP). The Karachi Water and Sewerage Services Improvement Project (KWSSIP) encompass a USD 1.6 billion reform-led investment program, to be implemented in four phases over a period of 12 years. Phase 1, with an investment portfolio of USD 100 million, is currently under implementation, and a Project Implementation Unit (PIU) has been established for this purpose. The Project Proposal Form (PC-1) for the Second Phase of KWSSIP amounting to US\$665.56 Million (PKR185.9 billion) has been approved by the Executive Committee of the National Economic Council (ECNEC). The project has been approved by the World Bank Board on 12th December 2024. The project has been implemented by the Government of Sindh (GoS) and the Karachi Water and Sewerage Corporation (KWSC) through multiple procurement processes, expected to occur within a short timeframe. The project activities aim to achieve key milestones, including addressing environmental aspects associated with the proposed project components

2. Project Components

KWSSIP-2 has been developed for institutional and governance reforms in KWSC along with strategic investments for the improvement of water and sewerage infrastructure and services in Karachi.

The following are the project components:

Component 1 – Operational & Enabling Environment Reform

- a. Institutional Reforms and Capacity Building in Human Resource (HR)
- b. Implementation of Communication Program & Capacity Development of Customer Relations Management (CRM)
- c. Implementation of Gender Action Plan (GAP)
- d. Capacity Building in Asset Management, GIS and Data Collection Strategy
- e. Preparation and Implementation of Water Safety Plans
- f. Outsourcing of Metering & Operation and Maintenance (O&M)
- g. Advance Studies for the adaptation of Trenchless technology of Infrastructure development in Karachi Water and Sewerage Program
- h. Financial Management improvement

Component 2 – Infrastructure Investments

- a. Rehabilitating Water Supply and Sewerage in Selected Low-Income Communities
- b. Priority Sewer Network Rehabilitation and Extension
- c. Priority Water Network Rehabilitation including O&M equipment, meters & District Metered Areas (DMAs) to reduce Non-Revenue Water (NRW)
- d. Priority Works for Reducing Energy Consumption
- e. K-IV Augmentation and Downstream Allied Works
- f. Rehabilitation of Existing Filtration Plants (NEK K-II, 100 MGD, Pipri JBIC 50 MGD)
- g. Viability Gap Funding (VGF) to support Public Private Partnership (PPP) Interventions

Component 3 – Project Management and Studies

- a. Design Review and Construction Supervision of the Proposed Sub-Projects of Phase-2
- b. Follow-up studies on energy audits
- c. Preparation of KWSSIP -3, feasibility, E&S study, designing & PC-1, follow up study from the Master Plan Study

3. Key duties, functions and responsibilities:

The Technical & Engineering Specialist (Structures) will provide specialized expertise to support all civil and structural components comply with national/international standards, project requirements, and World Bank guidelines. In this capacity, the Specialist will assist PIU-KWSSIP by reviewing the consulting firm(s) structural design deliverables for structural safety, durability and cost-effectiveness.

4. Scope of Work:

- Review structural designs, drawings, calculations, specifications, and BOQs for water supply and sewerage infrastructure including reservoirs, pipeline trench and shoring, pumping stations, treatment plants, filtration plants, underground and overhead tanks, structural supports for pipelines, buildings, and associated facilities.
- Review the consultant design philosophy is consistent with relevant international standards (ACI, AISC, ASCE) and Pakistan Building Code provisions.
- Review geotechnical investigation reports and ensure appropriate foundation systems are proposed considering Karachi's soil conditions.
- Review structural adequacy against seismic, wind, settlement, uplift, hydrostatic and operational loading conditions.
- Ensure resilience considerations are incorporated by the consultant, particularly for critical infrastructure such as treatment plants and pumping stations.
- Provide technical oversight during construction to ensure structural works are executed as per approved drawings and specifications.
- Conduct periodic site visits and inspections to review quality of structural works including reinforcement placement, formwork, concreting, curing, and testing.
- Review compliance with health and safety standards in structural construction activities.
- Identify structural risks, deficiencies, or non-conformities and suggest corrective actions to the consulting firm(s).
- Support preparation and review of structural sections of bidding documents, technical specifications, and evaluation criteria.
- Participate in technical evaluation of bids related to structural and civil works.
- Assist in pre-contract negotiations and provide structural inputs during contract finalization.
- Review structural variations, claims, and extension of time requests from contractors.
- Coordinate closely with design review consultants, supervision consultants, and contractors to ensure timely resolution of structural issues.
- Provide structural engineering inputs during meetings with stakeholders, including GoS, KWSC management, and World Bank representatives.
- Support integration of structural considerations into asset management planning and GIS database development.
- Contribute to risk management planning by identifying structural and constructability risks early in project cycles.

- Prepare technical notes, review comments, and compliance reports related to structural engineering aspects.
- Contribute to progress reports, audit documentation, mid-term reviews, and project evaluations by ensuring structural data accuracy.
- Maintain organized documentation of structural approvals, revisions, and technical decisions.
- Provide recommendations for value engineering and cost optimization without compromising safety and quality.
- Support emergency assessments of structural damages, if required.
- Undertake any other assignment related to structural engineering management as directed by the Senior Technical & engineering Specialist.

5. Qualifications and Experience

Bachelor's degree with a major in Civil or equivalent plus a Master's degree in Structural/Geotechnical/Earthquake Engineering or equivalent from The Higher Education Commission (HEC)-recognized university is required. The candidate should have a minimum of 10 years' experience on major civil works projects based on The International Federation of Consulting Engineers (FIDIC) form of contract and funded or supported by Multilateral Development Banks (MDBs). The candidate should possess strong structural engineering expertise with demonstrated experience in structural planning and analysis, software-based structural design, finite element modelling (FEM), and linear and nonlinear structural analysis, as well as the design of reinforced concrete and steel structures. The candidate must have expert knowledge and hands-on experience in the use of commercial structural engineering software packages applicable to the nature of the project. Additionally, the candidate should have experience in the preparation of structural specifications and bidding documents, review of engineering drawings and design calculations, construction supervision of structural works, and contract management related to civil and infrastructure projects. Prior exposure to the technical management practices of the World Bank or other multilateral development partners will be considered a strong advantage. Experience working in Pakistan or other countries in Central or South Asia is required. Membership and/or registration with a recognized professional engineering body is a requirement. Good English language communication and writing skills. Knowledge of local language (Urdu) is an added advantage.

6. Reporting Line

The Technical & Engineering Specialist (Structures) will report to the Sr. Technical & Engineering Specialist. The Specialist will be required to submit monthly activity/progress reports, highlighting key tasks undertaken.

7. Contract Duration

The Specialist is initially required to work for the period of three (03) years with an annual review on performance which will form the basis of renewal. The Probation Period will be for 3 months during/up to which the contract may be terminated owing to unsatisfactory performance. The contract can be terminated with one month notice period by either party. The position is based in Karachi with travel requirements to the site as and when required. The Structural Engineering Specialist may also be required to travel to other places or areas within or outside Pakistan on duty carrying out project related tasks including but not limited to meetings, workshops, training, due diligence for procurement, witnessing factory acceptance tests (FAT) etc.

8. Salary And Benefits and Conditions of Service

Market competitive salary based on qualification and experience will be offered. The salary, benefits will be discussed and agreed with the successful candidate. The contract and conditions of service follow the general conditions of service as stipulated in the Project Operations Manual (POM). These will also be discussed and agreed with the successful candidate.

9. Selection Process

An individual will be selected in accordance with process stipulated in Section VII of “Approved Selection Methods: Consulting Services, Clause 7.34, Approved Selection Methods for Individual Consultants under The World Bank Procurement Regulations for IPF Borrowers (Fifth Edition September 2023) available on <https://thedocs.worldbank.org/en/doc/6c0602876d68949e80820507d90a14ed-0290012023/original/Procurement-Regulations-September-2023.pdf>