

November 2020

Karachi Water & Sewerage Services Improvement Project [KWSSIP]

Project Implementation Unit, Karachi Water & Sewerage Board

Room No. 10, Block-C, 9th Mile KW&SB Office, Shahra-e-Faisal, Karachi

Request for Expression of Interest

For

Feasibility Studies, Design Review & Detailed Engineering Design of Group 03 Sub-Projects for SOP 2 of KWSSIP

[TORs, Instructions and Shortlisting Criteria for EOI]

Environment & Social Safeguard Studies as Part of Preparatory Works 01 for SOP 2 of KWSSIP

[TORs, Instructions and Shortlisting Criteria for EOI]

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**REQUEST FOR EXPRESSION OF INTEREST**

(CONSULTING SERVICES – FIRMS SELECTION)

**Islamic Republic of Pakistan**

**Karachi Water and Sewerage Services Improvement Project-2 (KWSSIP-2)**

**AIIB Special Fund - Grant Number: S0404A**

**Assignment Title: Feasibility Studies, Design Review & Detailed Engineering Design of Group 03 Sub-Projects for KWSSIP-2**

**Reference No. (As per Procurement Plan): 3**

The Karachi Water and Sewerage Board (KWSB) has applied for financing as Grant in Aid from the Asian Infrastructure Investment Bank (AIIB) toward the cost of the consulting services for the preparation of sub-projects of KWSSIP-2.

The consulting services (“the Services”) for the Group 03 Sub-Projects for KWSSIP-2 consist of (i) feasibility studies of bulk water supply options and detailed engineering design of the components of selected bulk water option; (ii) engineering designs for rehabilitation of existing and construction of new filtration plants; and (iii) review and update of the design of the K-IV augmentation works. The Services include level of effort of relevant professionals, with implementation period of **06 months**, expected start date of March, 2021, ensuring full consistency with the TOR attached to this REOI.

The detailed Terms of Reference (TOR) for the assignment can be obtained from the address given below during the office hours, i.e. 0900 – 1700 Hours on working days, Monday to Friday or downloaded from KW&SB website.

The KWSB now invites eligible consulting firms (“Consultants”) to indicate their interest in providing the Services. Interested Consultants should provide information demonstrating that they have the required qualifications and relevant experience to perform the Services.

The shortlisting criteria i.e. experience in providing services in the areas of Feasibility Studies and Detailed Engineering Design for three (03) infrastructure development works undertaken during the last ten (10) years, as detailed in the Section 3 (Shortlisting Criteria) of this document. Key Experts will not be evaluated at the shortlisting stage.

The attention of interested Consultants is drawn to Section II, paragraph 4.4, and paragraph 4.9 of the AIIB’s “Procurement Instructions for Recipients” June 2, 2016, setting forth the AIIB’s policy on conflict of interest and eligibility.

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 method set out in the Procurement Instructions for Recipients.

Further information can be obtained at the address below during office hours 0900 – 1700 Hours on working days, Monday to Friday

Expressions of interest must be delivered in a written form to the address below (in person, or by mail) latest by **12th January 2021.**

**The Project Director**

**Project Implementation Unit (PIU)**

**Karachi Water & Sewerage Services Improvement Project (KWSSIP)**

**Karachi Water & Sewerage Board**

**Room No. 10, Block-C, 9th Mile KW&SB Office,**

**Shahra-e-Faisal, Karachi.**

**Tel No. +92-21-99245134**

# Instruction to Consultants

## **General Instructions**

While expressing the interest, consultants have to consider the following:

1. The Project Implementation Unit (PIU) invites eligible consulting firms/ Joint Venture(s) with specific and proven competence and experience to indicate their interest in providing the services. Eligible firm(s) / JV’s should submit Expression of Interest (EOI) in English language along with the required relevant complete details of the qualification and experience requested in Item 3 – Shortlisting Criteria.
2. Interested consulting firm(s) / Joint Venture(s) must provide information indicating that they are qualified to perform above services (e.g. description of similar assignments, value of previous assignments, experience under similar conditions, availability of appropriate professionals etc.).
3. Association of consultants can either be in the form of joint venture (JV) or a sub-consultancy. Therefore, the consultant submitting their Expression of Interest in association should clearly mention whether the association is a Joint Venture or Sub-consultancy. The experience of all the firms in the JV will be considered for evaluation and each partner must meet the shortlisting criteria as defined under Section 3. In case of Sub consultancy, the experience of the sub-consultant will not be considered in qualification.
4. The maximum numbers of entities allowed in joint venture are three [03].
5. An applicant can express only one interest either as a single entity or in joint venture, however, a sub-consultant can associate with more than one applicant.
6. A firm that applied either as single entity or JV member cannot be a sub-consultant to another entity or JV. In such a case, all the applications in which the firm is involved shall be disqualified and rejected. While selecting a sub-consultant, applicants are advised to check this requirement.
7. A consulting firm / Joint Venture will be shortlisted in accordance with AIIB Procurement Policy, January 2016, and Interim Operational Directive: Procurement Instructions for Recipients, June 2016.
8. The attention of interested Consultants is drawn to Section II, paragraphs, 4.4 and 4.4.2 of the AIIB’s Interim Operational Directives on Procurement Instruction for Recipient (PIR) June 2016, setting forth the AIIB’s policy on conflict of interest that can be seen at <https://www.aiib.org/cms/en/search/index.html?query=procurement%20instructitons%20for%20recipient>
9. it is expected that the interested firm(s)/ joint venture(s) will have expertise in the areas of environmental and social management, all related public and donor-funded development projects / affairs of the city of Karachi in these areas including but not limited to management frameworks of these, dealing with relevant public sector governing authorities and coordination with, roles of civil societies, impacts of new projects, environmental and social safeguards, resettlement action plans, collection of data, field surveys, public campaigning, public hearings, specific problems of urban informal settlements [katchi abadi], land use patterns, village setup and system in rural areas etc.
10. The consultant(s) should ensure that the submitted information is correct. An EOI containing significant omissions / errors shall not be considered. A firm / JV qualifying on the grounds of misrepresentation of facts shall be disqualified at any stage even after the award of contract and the sanctions / penalties may also be imposed on the firm as per AIIB / World Bank’s rules and regulations.
11. The information need to be presented in a clear and comprehensive manner free of ambiguities. The copies of documents attached should be clean and legible.
12. If the EOI consists of more than one volume, the applicant must clearly number the volumes constituting the EOI and include a table of contents for each volume. **All documents should be securely bound**.
13. Consultant selection as a result of this REOI shall be in accordance with the Quality and Cost Based Selection Method. Both, local and international consulting firms can express interest.
14. Once your team is shortlisted and invited for submission of the Proposal, it is not permissible to transfer the invitation to any other firm, such as Consultant’s parent or sister companies, subsidiaries and affiliates.
15. The procuring agency will reject a Proposal if the Consultant drops a JV member without the Client’s prior consent, which is given only in exceptional circumstances, such as debarment of the JV partner or occurrence of Force Majeure.
16. Submit one original and two copies of EOI in hard format and soft copy of complete EOI on USB device. Documents related to qualification / generated docs have to be either in Word and Excel. Only attachments like certificates, company registration and financial documents are acceptable in scanned / pdf form.

# Information Needed for EOI

## Basic Information – Part A

1. Name of the Company, Phone, Fax, E-mail address, postal address of the head office and name of Contact Person. In case of JV, provide information of all JV members.
2. Certificate of Registration of the firm as Legal Entity. In case of JV, provide information of all JV members.
3. Firm(s)/ joint venture(s) name, address, copy of the Registration Certificate with relevant professional bodies of the concerned Government, supported by latest/ updated renewal, Country of Operations (if the firm is registered and operating in several countries). Memorandum/ Article of Association/ Partnership Deed or Joint Venture Agreement Or a letter of intent to form a joint venture (as applicable).
4. National Tax Number of the firm/joint venture;
5. List of other works similar to indicated in General and Specific Experience above completed in last ten (10) years or in progress of the firm / joint venture members indicating the following:
6. Name of the Project;
7. Name and address of the Client;
8. Value of the contract in US$.
9. Start and Completion Date
10. Whether worked as Consultant, Sub-consultant or JV Member. In case of JV Member indicate the share in the JV.
11. If worked as sub-consultant or JV member, provide details / component of works performed.
12. Any additional document(s) to support relevant experience of firm(s)/ Joint Venture(s);
13. List of the litigation/arbitration during last ten (10) years, if any, in which the company has been involved and the current status.
14. An Affidavit from firm / all the participating partners of the association / JV confirming that: (a) applicant firm has never been blacklisted by any International, Government / Semi Government Organization and (b) All the information provided by the applicant firm in this EOI is correct.

## Basic Information – Part B

**Expression of Interest (EOI) Consulting Firms**

Table 2.1: EOI for Assignment

|  |  |
| --- | --- |
| Assignment Name |  |
| Project Name |  |
| Project Country |  |

**I. Consulting Firm Information**

Table 2.2: Firm Information

|  |  |
| --- | --- |
| Date: | Country of Incorporation: |
| Consultant Name: | Acronym: |
| EOI Submission Authorized by: | Position |

**Associations (Joint Venture or Sub-consultancy)**

Table 2.3: Information of Association

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Consultant | Acronym | Country of  Incorporation1 | Joint Venture  (JV) or Sub- consultant | EOI  Submission  Authorized By | Position |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

**II. Assignment Specific Qualifications and Experience**

**A. Project References**

Please select three post relevant projects completed in last 10 years to demonstrate the firm’s technical qualifications and geographical experience where similar technical studies related to feasibility studies and engineering designs have been performed for the MDB’s financed projects for water supply systems which include bulk transmission, distribution and media-filtration based treatment facilities. The completion date of each project must be within last 10 years and the total construction value of each shall not be less than US$10 million. The services must include technical feasibility studies and detailed engineering designs. Minor engineering services such as pre-feasibility studies or conceptual designs will not be considered. The completion certificates are attached as per details below.

Table 2.5: Most Relevant Projects during Last 10 Years

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SN | Project | Period | Client | Country | Firm |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  |  |  |  |  |

Project Summary

**Project 1 of**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ● Project Name |  | | | | | |
| ● Name of Client |  | | | | | |
| ● Country |  | | | Project location  Country | |  |
| ● Participation |  | As lead firm  As associate firm | | | | |
| ● Value of Services |  | | (US$) | | | |
| ● Source of Financing |  | | | | | |
| • Consultancy Services | | | | | | |
| (i) No. of staff |  | | | | | |
| (ii) No. of person months |  | | | | | |
| • Length of Consultancy Assignment | | | | | | |
| ● Start Date |  | | | | (dd/mm/yyyy) | |
| ● Scheduled date of Completion |  | | | | (dd/mm/yyyy) | |
| ● Actual Date of Completion |  | | | | (dd/mm/yyyy) | |
| ● Continuous / Intermittent |  | | | |  | |
| • Name of Associate Firms (if any) | | | | | | |
|  | | | | | | |
| • No. of Person-Months of Professional Staff Provided by Associated Firm(s) | | | | | | |
| • Name of Senior Staff (Project Director/Coordinator, Team Leader) Involved and Functions  Performed | | | | | | |
|  | | | | | | |
| • Detailed Narrative Description of the Project with total cost | | | | | | |
|  | | | | | | |
| • Detailed Description of the Actual Services Provided by your Firm | | | | | | |
|  | | | | | | |

(Please insert more tables as necessary)

**III. Comments on Terms of Reference**

|  |
| --- |
|  |

**VI. EOI Attachments**

Table 2.6: Attachments

|  |  |
| --- | --- |
| SN | Description |
| 1 | Certificate of Incorporation of the lead member |
| 2 | Certificate of Incorporation of the JV member (for each member) |
| 3 | Certificate of Incorporation of the Sub-Consultant (for each sub-consultant) |
| 4 | Letter of Association/letter of intent to form a JV/Association |
| 5 |  |

(Please insert more rows as necessary)

**VI. Eligibility Declaration**

We, the undersigned, certify to the best of our knowledge and belief [Eligibility refers to AIIB’s Procurement Policy, Clause 5.8 and 7.0 on Prohibited Practice and Integrity].

Table 2.7: Eligibility Declarations

|  |  |  | Indicate  Yes / No |
| --- | --- | --- | --- |
| We have read the advertisement, including the terms of reference (TOR), for this assignment. | | |  |
| Neither the consulting firm nor its JV member or sub-consultant or any of its experts prepared the TOR for this activity. | | |  |
| We confirm that the project references submitted as part of this EOI accurately reflect the experience of the specified firm/consortium. | | |  |
| We further confirm that, if any of our experts is engaged to prepare the TOR for any ensuing assignment resulting from our work product under this assignment, our firm, JV member or sub-consultant, and the expert(s) will be disqualified from short-listing and participation in the assignment. | | |  |
| All consulting entities and experts proposed in this EOI are eligible to participate in AIIB-funded, supported and administered activities. | | |  |
| The lead entity and JV member or sub-consultant are NOT currently sanctioned by AIIB or other MDBs. Neither the consulting firm nor the JV member or sub- consultant has ever been convicted of an integrity-related offense or crime related to theft, corruption, fraud, collusion or coercion. | | |  |
| We understand that it is our obligation to notify AIIB should any member of the consortium become ineligible to work with AIIB or other MDBs or be convicted of an integrity-related offense or crime as described above. | | |  |
| JV member or sub-consultant, including all proposed experts named in this EOI, confirmed their interest in this activity in writing. | | |  |
| JV member or sub-consultant, including all proposed experts named in this EOI, authorized us in writing to represent them in expressing interest in this activity. | | |  |
| None of the proposed consortiums are subsidiaries of and/or dependent on the Executing Agency or the Implementing Agency or individuals related to them. | | |  |
| We understand that any misrepresentations that knowingly or recklessly mislead or attempt to mislead may lead to the automatic rejection of the proposal or cancellation of the contract, if awarded, and may result in further remedial action, in accordance with AIIB’s Prohibited Practice. | | |  |

# Shortlisting Criteria

## Shortlisting Criteria

The shortlisting criteria is as under:

Table 3.1: Shortlisting Criteria

| **No.** | **Criterion** |
| --- | --- |
|  | **General Experience** of providing services in the areas of Feasibility Studies and Detailed Engineering Design for three (03) infrastructure development works undertaken during the last ten (10) years.  List the project name, name of the Client, location and type of facility / development for that works were performed.  Single Entity: Must Meet.  Joint Venture:  The Lead Member: must have done two [02] projects  Other Members: must have done minimum one [01] project of above nature |
|  | **Specific Experience of Water Supply and Filtration Plants:**   1. Experience of at least three (03) bulk water supply consultancy assignments completed in the last ten (10) years for Feasibility studies, detail design, / design review of contracts value equivalent to US$ 0.25 million, are required. 2. Experience of at least two (02) consultancy assignments for Feasibility studies, detail design of Rehabilitation / Construction of Filtration Plants, having consultancy contract value of US$ 0.20 million, are required. 3. All above consultancy assignments should have been for the projects having construction value of US$ 10 million, are required.   Single Entity / Firm: Must Meet  **Joint Venture:**   1. The lead member must have done at least one [01] water supply and one [01] water filtration project of value as defined above.   Other members: must have done either one [01] water supply or one [01] water filtration project.  The projects listed here and in Item 2 above:   * must be a completed project with a completion certificate issued by the Client. Attach the Completion Certificate and letter of award indicating the contract value for each reference project. * If the work(s) have been performed in a joint venture, indicate share in the JV to work out the number of projects required for the qualification of this assignment. |
|  | Overall **Managerial Capacity** (Core Managerial and Technical Staff) |

Appendices

|  |
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| [Appendix A. Terms Of Reference 13](#_Toc56524253) |

**Appendix-A**

# **Terms of Reference for Feasibility Studies, Design Review & Detailed Engineering Design of Group-03 Sub-Projects for KWSSIP-2**

**1. Background:**

Karachi, a megacity, is Pakistan’s premier Industrial and Financial center, and the economic capital of Pakistan. The city with its two sea ports is responsible to handle 95% of Pakistan’s foreign trade. Karachi is one of the ten largest cities in the world and its population is continuously increasing with a large number of citizens settling in informal settlements (Katchi Abadis). In addition, Karachi is also expanding horizontally and vertically, dovetailed with mushroom growth of commercial interventions.

Karachi, like all megacities, has grown so quickly that it struggles to deliver basic infrastructure services, including potable water and wastewater collection and treatment. The water and sewerage utility, Karachi Water and Sewerage Board (KW&SB), is no longer equipped or empowered to deal with the challenging reality on the ground. There is a huge unmet demand for water (550 MGD current capacity versus an estimated demand of 1200 MGD); and a high non-revenue water percentage (50-60 percent); Most of KWSB’s 1.1 million customers get water through the piped network on an irregular basis, and some just 2-4 hours every other day. There is currently no sewage treatment, as the city’s sewage treatment facilities are dilapidated and not working, resulting in an estimated 475 MG of sewage/day being discharged into the Arabian Sea. The utility has not had significant capital investment for more than a decade, and most of its infrastructure is worn out and operating far below its rated capacity.

To deal with the deteriorating water and sewerage services in Karachi, Government of Sindh has conceived Karachi Water and sewerage Services Improvement Program to transform the KWSB into a financially viable and technically well performing water utility that ensures clean, safe drinking water and sewerage services to the general public. AIIB and WB approved the Karachi Water and Sewerage Services Improvement Project-1 (KWSSIP-1) in 2019, the first phase of a planned Series of four Projects (SOP-I) under this Program, in which AIIB and WB are providing USD40 million each to support critical water and sanitation infrastructure and operational reforms. The proposed second phase of this program (KWSSIP-2 or SOP-II) will deepen the reforms undertaken under the Phase-1 project and significantly scale-up the infrastructure investments to improve water supply and sewerage services in Karachi. The investments in the rehabilitation of existing and the construction of new infrastructure will enhance the development impacts by reaching more beneficiaries, at the same time, building support for continued mainstreaming of the operational reforms. Proposed activities are grouped into three components:

1. Reforms of KWSB: This component will continue to build capacity and improve the operational performance of Karachi Water and Sewerage Board (KWSB) by supporting institutional reforms; revenue management, customer care and communication; non-revenue water reduction; preparation and implementation of water safety plans; water wastage reduction program and water audits.
2. Securing Sustainable Water Supply and Sewerage Services: This component will invest in key water and sewerage infrastructure to address three interlinked structural problems in Karachi’s water and sanitation system – the overall supply shortfall; the low water quality; and the lack of sewage treatment capacity. Proposed sub-projects include:

* *Additional bulk water supply investments:* KWSB currently has a quota to withdraw 650 million gallons per day (MGD) from the Indus River but is effectively only using 515 MDG of this allocation. This water is supplied to Karachi from Keenjhar Lake, a freshwater lake which supplies water to Karachi, through a network of open channels, conduits, pumping stations and pressurized transmission pipelines. The project will invest in additional bulk water investments by using the remaining quota (approximately 135 MGD) of its allowed withdrawal from the Indus River.
* *Malir basin wastewater interceptors and treatment plant (S-3 Phase 2):* This sub-component would improve the ability of KWSB to collect and treat wastewater in the Malir basin of Karachi. The sub-component will finance construction of a trunk interceptor to collect the wastewater generated in the Malir river basin and construction of 180 MGD treatment plant.
* *Water supply and sewerage investments in additional low income communities (Katchi Abadis ):*  Building on pilots in three *katchi abadis* during the first phase, the proposed KWSSIP-2 will quadruple support to informal settlements, expanding infrastructure investments as well as accompanying social and communications measures by improving water supply and sanitation services.
* *Priority sewer network rehabilitation & extension and rehabilitation of wastewater pumping stations):* The project will scale up investments in priority sewerage rehabilitation to restore network integrity in critical areas, and to reduce sewage leakage.
* *Priority water network rehabilitation and extension including District Metering Areas (DMAs) to reduce NRW:* Scaling up interventions under phase-1, this proposed sub-component will reinforce the non-revenue water and revenue management reforms of Component 1, priority areas of the network will be rehabilitated, focusing on reducing major leaks, installing district and customer meters, and developing chlorination facilities. Reducing NRW losses and introducing consumption metering will increase the supply of water and promote the conservation of water.
* *Reducing energy consumption:* This subcomponent will implement the recommendations of the Energy Audit carried out under the KWSSIP-1. It is likely to involve major equipment modernization, particularly in KWSB’s main pumping stations.
* *K-IV augmentation:* This sub-component will involve the connection of the government financed K-IV water treatment plants to the water network, thus leveraging existing counterpart investments to significantly improve water supply by up to 260MGD.
* *Rehabilitation of existing and construction of new filtration plants:* This proposed sub-component responds to the challenge of water quality by including an allocation for the rehabilitation and construction of water filtration plants, so that KWSB can treat all its existing raw water as well as the additional water to be made available.

1. Project Management: This component will support project management, implementation supervision and institutional strengthening of KWSB.

AIIB is providing approximately US$4.136 million to KWSB as Project Preparation Special Fund Grant (the Grant) to finance technical and environmental & social consulting services for preparation of the different sub-component of the KWSSIP-2.

**2. Objectives of the Assignment**

The objectives of the assignment are to carry out technical assessments including feasibility studies, design review and detailed engineering designs for the selected investment sub-projects mentioned under the Component-2 above. The ToRs have been framed to assist KWSB in carrying out designs and preparation of bidding documents for the following three sub-projects:

1. Additional bulk water supply investments
2. K-IV Augmentation Works
3. Rehabilitation of existing and construction of new filtration plants

**3. Scope of Services, Tasks and Expected Deliverables**

The Scope of Services consist of three assignments which are detailed below:

## **A. Feasibility Study and Detailed Design for Additional Bulk Water Supply Investments**

**Background:** Karachi is the Pakistan’s largest city, main seaport and international trade hub having a unique demography. The city is expanding horizontally and vertically and struggling with numerous governance challenges. One of the major challenges is Karachi’s water supply, falling far short of the city’s expanding needs. To cope with the present and future needs of water supply for Karachi, KW&SB is continuously working to explore ways and means to increase the quantity by implementing mega bulk water scheme Phase –I of K-IV project to bring 260 MGD additional water to Karachi.

Based on the site information, informal studies and the flow measurement at Dhabeji and Gharo Pumping stations located at the downstream of the bulk conveyance system, it is revealed that KW&SB is drawing water much less than the approved quota from Indus which can be transmitted to Karachi through an alternate system to be constructed within the available ROW of KW&SB. The total approved water quota for Karachi from Indus source is 1200 Cusecs (648 MGD). The record speaks that out of 648 MGD; only 520 MGD water is being pumped from Dhabeji and Gharo due to system constraints.

This sub project of KWSSIP is planned to transmit the balance water from the existing quota (Indus source). On conducting the flow measurements, the water quantification will be carried out to calculate the volume of balance water available which will then be conveyed to Karachi through the proposed investment by AIIB. The feasibility study shall also assess whether or not the existing GKWSS network has the capacity to accommodate the additional bulk water and that enough land is available within the ROW of KW&SB to lay the new bulk water conveyance system. The study should also look into the impact the proposed project will have on land availability for future bulk water extensions. The proposed bulk water supply enhancement scheme shall consists of construction of integrated system comprising of conduit, inverted siphons, pumping stations, rising main(s) & interconnection at different drawl points of the existing bulk water supply system of KW&SB and the conveyance of the additional water to the deficit pockets of various areas of Karachi.

Hypothetically, the mass balancing equates the total water supply from Indus is as follows.

1. Pumping from Dhabeji (Metered) = 480 MGD
2. Pumping from Gharo Pumping Station = 20 MGD
3. Supply to Pakistan Steel Mile & Port Qasim) = 20 MGD

Total Supply for Indus = **520 MGD**

On realization of the prevailing position of water availability and to utilize the approved quota of 1200 Cusecs (648 MGD) from Indus source to optimal, Government of Sindh has decided to instantly carryout a detailed feasibility study to authenticate the actual flows / drawls from Kinjhar headworks by KW&SB. Based on quantification of water and mass balancing, the availability of water will be determined to conceive an alternate bulk water scheme following the GKWSS corridor to transmit the available water to Karachi terminating to the proposed point technically suitable and viable from where the same may be transmitted to the deficit pockets of the city.

The Government has decided to implement the proposed project under KWSSIP-2 funded by World Bank / AIIB on priority basis. Certain prerequisites need to be adhered to in line with guidelines of the donor agencies to take-up the project for financing which includes proper feasibility and socio environmental assessment. Following tasks will be performed under the Scope of Services:

**Feasibility Study:**

The consultant are required to holistically carryout but not limited to the tasks stated hereunder to achieve the desired goals

1. Review all the available relevant data / studies with KW&SB, regarding the Bulk Water Supply projects (GKBWSS, K-II, K-III) for Karachi, the supply of water from Gharo Pumping Station along with 65 MGD Project.
2. Carry out detailed Survey in respect of following but not limited to:

* Reconnaissance Survey,
* Topographic Survey.
* Hydrological Survey.
* Geotechnical Investigations

1. Study and survey the land assets acquired by KW&SB and confirm the availability for right of way, on the existing bulk water supply corridor for the proposed work.
2. Carry out the financial and economic analysis of the project comparing the with- and without-project scenarios.”
3. Conduct water quantification exercises using modern and most reliable flow measurement devices / techniques to ascertain the actual water flows.
4. Determine the flows at various sections of KG Canal Gujjo Head works and downstream with all withdrawal points, , Dhabeji Pump Houses Intakes, Dhabeji Pump Houses Rising Mains, High Point (Fore bay) and Interconnection Chambers of K-II, K-III and GK Conduit at Pipri, NEK New and COD to assess the system losses all along from Chillya Head regulator to COD and to firm up balance quantify of water still available from the present allocated quota of 1200 cusecs (648 MGD).
5. Assess the present carrying capacity of the Kinjhar Gujjo Canal upto upstream of Syphon-I (Canal Structure) and Gujjo Head works and propose any rehabilitating works, de-silting / de-weeding, propose any or all appropriate rehabilitating works required to improve/ restore the design capacity of the canal for its optimum utilization.
6. Explore and study different options suggested by Bulk Water Supply Department of KW&SB to convey the balance available water out of the allocated quota of Karachi from Chillya Head regulator to the terminal end at Pipri and COD and suggest transmitting water to deficit pockets of Karachi. The consultant shall also explore the Haleji route terminating at T&C Reservoir via Gharo Filter plant. Lifetime cost and risk of failure should be considered when studying the different options.
7. Develop and provide Technical Report based on the available and evaluated information to conceive the proposed bulk water supply scheme of balance water including incorporating the following,
   1. Right of Way (ROW) assessment.
   2. Socio economic data,
   3. Proposed alignment with all allied details and data of existing and proposed scheme.
   4. Hydrological data with proposed cross drainage facilities,
   5. Flood record and geotechnical data.
   6. Land acquisition plan with associated cost, if any
   7. Identification of any encroachment over KW&SB reserved land up to COD,
8. Conduct a detailed topographic survey of the proposed route from Chillya Head regulator to COD Filter Plant. The survey shall be tied with TBM to be obtained from Survey of Pakistan and Ground Control Points shall be established using Precise Satellite Imagery Tools and GPS for the entire proposed route. Available land with in the right of way of KW&SB shall be clearly marked, pinpointing any encroached area. Identification of any or all piece of land to be acquired to construct proper, effective bulk water conveyance system. .
9. Study the historic rainfall data and climate change impute on existing drainage pattern within the project area and proposed appropriate number of cross drainage to ensure protection and safety of the proposed and existing water conveyance system during flooding.
10. Propose interconnections for the proposed conveyance system at physically possible points with existing system from smooth transmission of water at terminal ends Pipri & COD.
11. Propose augmentation plan for the additional water terminating either at Pipri, NEK and /or COD Filter Plants, dovetailed with K-II, K-III and GK systems of KW&SB.
12. Providing details of interconnections, if required to supply additional water to the downstream distribution networks in the city, through system condition assessment & capacity surveys.
13. Perform the preliminary hydraulic design and stimulations of the proposed components of the project including Head regulator, KG Canal rehabilitation (if required), conveyance works from Gujjo Head Works to COD Hill Filter Plant, including Pumping Stations, Fore Bay structure, Rising Mains, Transmission Pipelines and Interconnections.
14. Energy requirement to pump and filter the additional water for the project with its cost implication (CAPEX and OPEX)
15. Prepare wholesome plan to treat the additional water to be transmitted either by construction of new Filter Plants or increasing the capacity of the existing Water Treatment Plant.
16. Consultant shall prepare detailed feasibility Report including the facts and findings, mitigation strategies, to device a Decision Matrix that makes the proposal the most feasible and economic option to be considered all advantages and disadvantages of options shall be discussed at length in report.
17. The Consultant shall propose the components for the new water conveyance system incorporating any modification in 65 MGD Project.
18. Submit a Preliminary Engineering Design Report to KW&SB / GOS with the probable cost of the best feasible & viable option.
19. The preliminary designs will include the cost estimates (CAPEX and OPEX) of the entire project proposed in order to make it a part of the SOP 2 of KWSSIP.
20. Determine Economic and Financial viability of the proposed project.
21. Develop the Conceptual / Preliminary Design for the best option.
22. Propose permanent flow measurement stations in the recommended bulk water system.

**Detailed Design:**

The Consultant shall perform but not limited to the following tasks:

1. Critically review the Feasibility Report, Conceptual / Preliminary Design specially the recommendations made in the Feasibility study.
2. Confirm the findings by using high resolution satellite imagery regarding GKWSS right of way assessment, encroachment analysis, available corridor, resettlement issues, land use classification and detection of any changes required to implement the project.
3. Establish ground Control points using GIS on the proposed alignment and shall mention the same on the drawings
4. Revisit the socio economic analysis for further authentication.
5. Perform computerized hydraulic modeling and stimulation of the GKWSS and the proposed route to transmit the additional water from intake to terminal points.

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1. Undertake the hydrological analysis to cover all aspects of climate changes with impacts on the existing the proposed water supply network with mitigation plan.
2. Design the remodeling / rehabilitation / modification works to be carried out from Chillya headwork to upstream of Siphon – I at Gharo as envisaged in the Feasibility report to remove and bottleneck in transmitting 648 MGD water supply. All the connections present in the segment shall also be designed, if required.
3. All the remedial / repair works to be quantified and designed to maintain laminar flow in the open canal following the designed hydraulic gradient.

1. Design remodeling works to overcome any or all bottlenecks to transmit 648 MGD from Syphon–I, unlined baby canal section, Syphon-II and downstream transmission chamber of Syphon-II or otherwise propose alternate solution to carry the additional water from the above section.

1. Design the comprehensive bulk water conveyance system on the proposed route including conduit, syphons, pipelines, pumping station, rising mains, transmission chambers, cross drainage sections, causeways, flow measurement stations, protection system in Nullahs and river beds and other auxiliary works related to the system.
2. Detailed design of the intake and interconnection of the new system with the existing system.
3. All relevant documents, data, drawings shall be provided with standards and specifications clearly mentioned.

1. Identify and design works related to strengthen the existing GKWSS, K-II and K-III and repairing of the major leaks identified during the physical inspection.
2. Device implementation plan to execute the works in components for early completion of the project.

1. Prepare Cost Estimates with rationale.
2. Propose realistic timelines and best methodologies for each component using latest internationally accepted project management tools in practice.
3. Prepare detailed tender drawings covering all aspects with proper lines and levels tied up with TBM obtained from survey of Pakistan.
4. Prepare B.O.Qs, Bidding Documents, tender drawings and shall provide all the data available with them.
5. Energy requirement shall be considered in design consideration and shall be made an integral part of the BOQ.
6. Incorporate any views or suggestions in the designing beneficial for the project.
7. Perform any or all tasks relevant to the project which considers to be important and essential for the project.
8. Provide all technical assistance to KWSSIP / Procurement Consultant during the bidding process to answer the queries of the participants, sharing of the information to bidders and to streamline the procurement process.

**DELIVERABLES**

By way of illustrations, and not limitation, the reports to be submitted by the Consultants to KWSSIP as part of deliverables under consultancy services will include the following. A common Inception Report for all the assignments will be submitted within given timelines.

| **Description** |
| --- |
| Common Inception Report of Group 3 Works (Part A, B & C) |
| **Feasibility Study – Part A**  Flow Measurement (Quantification) Study of GKWSS, K-II, K-III and Haleji System. |
| Geotechnical investigations, Topographic Survey report |
| Condition Assessment Report of the existing Bulk Conveyance System from Chilya Regulator all along up to COD Filter Plant. |
| Right-of-Way (ROW) Assessment Report including resettlement requirements, encroachment, if any or Land Holding by Private Owners |
| Feasibility Report (Draft); covering all socio economical, technical, financial, with mitigation plan of the most viable alternate route to bring additional balance water available to Karachi |
| Feasibility Report (Final) |
| **Detailed Design** |
| GIS Mapping using high resolution Satellite Imagery |
| Area of Land to be acquired, if required. |
| Computerized hydraulic modeling of proposed route |
| Hydrological Analysis |
| Cost Estimates with rationale |
| Timelines and Methodologies. |
| Drawings & documentation for the Proposed Project with Revision / modification. |
| “Design Report (Draft) |
| “Design Report (Final) |
| Other reporting requirements including monthly progress report, presentations, or any other relevant Details / Documents. |

## **B. Design Review of K-IV Augmentation Works**

**Background:** KW&S, is chiefly involved in the execution of Phase – I of The Greater Karachi Bulk Water Supply Scheme (K-IV Project), on 50:50 cost sharing basis jointly he  GOS  and GOP to augment the city's daily water supply. The entire scheme of K-IV Project is designed to provide 650 MGD water to Karachi and is planned to be executed in three phases. Phase-1 of the Scheme will provide 260 mgd from Kinjhar Lake and is designed with all the facilities of bulk water conveyance system, storage, filtration and pumping stations. To supply the water to various deficit pockets of the city, to interconnect the Phase-I with the existing system, the Consultant (M/s Osmani and Company Pvt Ltd) has designed an augmentation plan to distribute 260 MGD water from the reservoirs to be constructed under Phase-I as follows”

1. R-1, 130mgd from Reservoir-I of K-IV up to COD Filter Plant.
2. R-2, 65mgd from Reservoir-2 of K-IV up to Qasba & Banaras.
3. R-3, 65mgd from Reservoir-I of K-IV Connecting New Malir, DHA, Bahria Town, Malir Town.

The Government has decided to implement the Augmentation Works under KWSSIP-2. to construct the specified works to interconnect the existing network with the proposed facilities to be constructed under Phase-I of K-IV project, thus to improve water supply in Karachi’s deficient localities.

Pipelines of large diameters will likely to be laid to be laid probably on the prosed route(s) / alignment(s) identified in the already Design Report on Augmentation Plan emerging from the three water service reservoirs (RI, R II & R III) under K-IV, which will improve the overall water shortage .

The sub project requires extensive survey, in-depth and detailed analysis as it involves the interface with the under construction Phase – I of K-IV together with dovetailing the proposed works with the existing water mains at various points.

Objectives of the K-IV augmentation works are to improve & meet the demand of potable water of Karachi up to some extent with well integrated system of bulk transmission, & distribution of water to reduce the gap between demand and supply, presently under stress due to shortage of water. At the same time, to improve the Revenue Recovery of KW&SB by supplementing additional water to the system, consequently impacting its financial viability and reinstating the confidence of the Consumer in KW&SB.

Following tasks will be performed under the Scope of Services:

**Design Review:**

1. Collect all the relevant data, information, lines and levels pertaining to the K-IV interface with the proposed project for identification of works to be performed by the Contractor of K-IV project and the Contractor later to be engaged on this project.
2. Liaise with the CE (Bulk Transmission & Distribution), KW&SB to obtain all the available relevant data, details, information of the existing system required for proper interconnection to transmit the specified volume of the water.
3. Review & analyze the available record, surveys, investigations & data to be well acquainted with the site conditions.
4. Carry out the physical survey of the entire proposed route and also using GIS system to assess & analyze site conditions.
5. Use Satellite imagery to identify any land acquisition required by KW&SB to implement the project.
6. Perform socio economical exercise to determine any or all the resettlement issue (s), land usage and impediments with mitigation plan.
7. Reconfirm the Surveys carried out by the other Consultant and establish Ground Control Points using effective GIS.
8. Undertake any or all the following surveys, if required, to firm up a comprehensive data base for the designing purpose

* Reconnaissance Survey,
* Topographic Survey.
* Hydrological Survey.

1. Every identified route shall be examined emerging from three Water Treatment Works ( R1, R2 & R3 ) to existing interconnection points, taking into account the life-time cost of the different routing, material and diameter options.
2. Review the network absorption capacity at the proposed interconnection points including the needs for service reservoirs.
3. Carryout the Geotechnical Investigations and hydrological assessment, if required to determine the number and size of causeways, protection works within Nullahs etc
4. Determine the Economic and Financial viability of the proposed project. Carry out the financial and economic analysis of the project comparing the with- and without-project scenarios.
5. Review the L-Sections provided by the other Consultant for the authenticity and show all the information, if missing, in respect of the underground and on ground services (roads, water and sewerage services, electrical, optical fiber or any other) running parallel or traversing the proposed alignment
6. Carry out the Computerized Hydraulic Modeling and stimulations and prepare Hydraulic Assessment Report which will form the basis of the detailed design.
7. Review the detailed design including selection of pipe material, size and quality assessment of the trunk mains proposed in the project.
8. Assess the local manufacturing and the availability of the specified pipe material and production capacity of the pipe manufacturer to provide the required quantity and size on time.
9. Prepare holistic, integrated Detailed Design Review Report incorporating any or all the information missing in the Original Design. For the best option.

**Design Phase:**

Based on the Design Review Report and its findings and recommendations made thereof the Consultant shall undertake but not limited to the following tasks:

1. Precisely detailing the interface of the upstream interconnection with K-IV proposed Reservoir (s) and provide best technically sound solution incorporating all the lines, levels, proper tie – up with the GCP using GIS.
2. Providing comprehensive and detailed design solution to interconnect the proposed trunk main with the existing system to ensure transmission of the specified quantity through the integrated interconnection fully harmonized with the existing system.
3. Prepare and design the best economical modified / altered route to safely transmit the additional water from the three different reservoirs in conformity with the prevailing ground conditions.
4. Provide detailed cost estimates with rationale.
5. Prepare the real timelines and the most appropriate methodology to ensure smooth implementation of the works using latest globally accepted Project Management Tools
6. Prepare all necessary drawings & documentations to be provided with the Modified Design Report including GIS Mapping etc. Land acquisition plan, resettlement issues with mitigation plan, land usage etc.
7. l Formulate all the Bidding Documents, Drawings and data / Reports including comprehensive bill of quantities to facilitate smooth procurement process.
8. List out all necessary Approvals / NOC’s/ Permissions, etc required during the currency of Proposed Project from Government / all Regulatory Bodies or any relevant Authority.
9. Consultant shall perform any other assignment which in its opinion is essential for precise design assignment.

**DELIVERABLES:**

By way of illustrations, and not limitation, the reports to be submitted by the Consultants to KWSSIP as part of deliverables under consultancy services will include the following. A common Inception Report for all the assignments will be submitted within given timelines.

| **Description** |
| --- |
| Common Inception Report of Group 3 Works (Part A, B & C) |
| **Design Review** |
| Hydraulic Modeling Report |
| Assessment Report on the Capacity & Conditions of the Existing Network (Terminal Point of the Project) |
| Report on the identified routes with necessary modifications and recommendations. Route from three Water Treatment Works ( R1, R2 & R3 ) to existing Reservoirs / Networks. |
| Hydrological Assessment Report |
| Design Review Report (Draft) |
| Design Review Report (Final) |
| Selection of Pipe Material/Specifications, diameter and routing with merits and demerits |
| Modified Design Phase |
| Modified Design Report incl. financial and economic analysis (Draft) |
| “Modified Design Report incl. financial and economic analysis (Final) |
| Bidding Documents & drawings, specifications, standards etc |
| Cost analysis with rationale |
| Other reporting requirements including monthly progress report, presentations, or any other relevant Details / Documents. |

## **C. Feasibility Studies and Design for Rehabilitation of Existing & Construction of New Filtration Plants**

**Background:** Provision of safe clean water to the people is the topmost priority of the Government. Unfortunately, the quality of water sources is degrading with passage of time and is being continuously contaminated because of poor water management. . It is becoming hard for the people of Karachi to have an access of potable water treated both biologically and chemically treated. The project aims to provide safe drinking water through water purification plants by rehabilitating the existing utilities and construction of new plants where required.

The water quality has been seriously deteriorated resulting in a serious threat to public health. To improve the water quality of supplied water, 9 water filter plants were constructed from 1943-2006. However, the KWSB has failed to supply stable and sufficient water amount due to its structural and mechanical/electrical weaknesses, the filter plants are not properly functioning and require major overhauling and up gradation. From the customer’s perspective, the most severe problem in the opinion of customers is shortage of water including low service pressure and also the water quality of supplied water.

The existing filter plants, comprising of, clarifiers / pulsators, chemical mixing / dosing mechanism, disinfection facilities (Chlorination System), filter beds with filter media equipped with air wash and a wash water pump from the directly beneath the filters to a wash water holding tank, have already surpassed their design life. Filter piping gallery are mostly in poor condition and requires upgrades in order to remain in service. Significant amount of pipe, pipe fittings, valves, and electrical equipment are in need of replacement due to corrosion. The cause of the severe corrosion in this area is likely due to a combination of chlorine vapors from the leaking pipe joints, valves and filter walls. The corrosive environment needs to be addressed in order to prevent future corrosion. Lack of maintenance required to keep the facility in full operation resulted in reduced operating capacity of the filters. Corrosion has impacted the concrete, piping, and equipment in the filter gallery.

**Details of Existing Filter Plants in Karachi:**

| **Sr. No No** | **Location** | **Capacity (MGD) (MGD)** | **Year Constructed Construc** |
| --- | --- | --- | --- |
| 1 | COD | 70+45=115 | 1962 |
| 2 | Pipri (old) | 25+25=50 | 1971 |
| 3 | Pipri (JBIC) | 50 | 2006 |
| 4 | NEK (OLD) | 25 | 1971 |
|  | NEK (K-III) | -- | -- |
| 5 | NEK (K-II) | 100 | 1998 |
| 6 | Hub | 80 | 2006 |
| 7 | Gharo | 10+10 =20 | 1943 |
|  | **Total** | **440** |  |
|  |  |  |  |

The flows quoted in the table represent the approximate capacities of the present water treatment facilities at respective location The project aims to improve the quality of potable water by rehabilitation of the existing water filter plants and to construct new water treatment plants where requires to meet the requirement.

**SHORTFALL IN EXISTING FILETR PLANT TREATMENT FACILITIES**

The Filtration plants are not performing to their designed capacity due to poor maintenance and there is significant deficiency in treating the overall total bulk water supply before transmission to the city areas. The shortfall needs to be assessed and remedial / rehabilitation measures require to be determined to improve the performance of the existing water treatment facilities to maximum and to identify the sites to construct new treatment plants with preliminary design to ascertain the treatment of the raw water of the total 648 MGD water with integrated approach.

The objectives of the Rehabilitation of the Existing Filtration Plant and to Construct New Facilities for water treatment is to (i) make the existing water treatment facilities rehabilitated / upgraded / modified to filter water to achieve the specified standards and to function to the design capacity of WTP, and (ii) To construct new treatment plants to treat the raw water which at present is being supplied untreated to achieve the specified quality standards of potable water to meet the demand with the standby facilities.

Following tasks will be performed under the Scope of Services:

**Feasibility Study:**

The Consultant shall perform the tasks with dedication stated herein before but not limited to the following:

1. Support the client in complying local regulatory requirements for obtaining project’s clearances.
2. Assess the Raw Water Quantity & Quality at the intake of the existing water treatment plants.
3. For New Filter Plants to be proposed at appropriate location the raw water quality and quantity assessment to be carried out.
4. Measure and Analyze the Flow & Pressure at Raw Water Inlet chambers as well as at all critical stages of Treatment Process of all existing Filter Plants of KW&SB, with the most efficient and reliable, calibrated, flow measuring devices, by taking predefined set of readings & days of week.
5. Assess & analyze the Treatment Capacity & Conditions of the existing Filter Plants (all units) to identify and prioritize structural rehabilitation & capacity improvement.
6. Analyze the Treatment Process with regards to the Raw Water Quality for Existing & New Filter Plants.
7. Identify and propose the best site locations to construct new filter Plants in view of the existing hydraulic parameters and constraints.
8. Review & analyze the existing available surveys, investigations & data with respect to Existing and New Filter Plants.
9. Conduct detailed Survey for the construction of New Filter Plants as follows but not limited to:
10. Reconnaissance Survey,
11. Topographic Survey.
12. Geotechnical survey.
13. Soil investigations
14. Develop the Conceptual / Preliminary Design for the Construction of New Filter Plants on EPC mode. This shall take into account the life-time costs.
15. Determine the power requirement for the Newly Proposed Filtration Plants and carryout the energy audit of the existing facilities.
16. Propose any housing facilities required for the operational staff on commissioning of the filter plants.
17. Assess the land acquisition plan for KW&SB to confirm the possibility to construct the new facilities within the available ROW.
18. In case ROW is not available earmark the land required to construct the new plants, mitigating all the resettlement issues, if exists.

1. Carry out the Financial Analysis of Project in line the WB guidelines for each member Water Filter Plant by calculating financial internal rate of return (FIRR), and other related Parameters (like Capital Cost, O&M Cost etc) to determine the financial feasibility of the project . Carry out the financial and economic analysis of the project comparing the with- and without-project scenarios.
2. The Consultant will carry out the economic feasibility of Project with the World Bank guidelines for each member Water Filter Plant by calculating economic internal rate of return (EIRR) along with other related Parameters.
3. Prepare detailed Feasibly Report incorporating the above mentioned tasks and / or any other assignment essentially required for a comprehensive technically sound project bot economically and financially viable.
4. For new Water Treatment Plants carry out the feasibility and design for connection to the network.

**Design Phase**

The Design Phase has been divided into two categories based on the outcome of the Feasibility Study conducted by the consultant.

1. Detailed Designing of the Modification / Rehabilitation of the all Existing Water Filtration Plants.
2. Conceptual Design to construct new water treatment facilities and network connections on EPC standard guidelines.
3. **Rehabilitation / Modification of Existing Water Treatment Plants**

The consultant with great precision and opting best acceptable globally recognized engineering practices shall carryout the detailed designing including but not limited to the following tasks:

1. Review the approved Feasibility Study and incorporate any or all the essential shortcomings identified at later stage after submission of the Final Feasibility report.
2. Review all the drawings and information of the individual units of the WTP to firm up the preliminary data in connection with the existing facility.
3. Determine the quality of raw water at the intake, after each intermediate process and at the treated water to determine the efficacy of overall treatment processes and functionality of WTP.
4. Physically survey the entire premises to conclude the prevailing conditions of the plant, machineries, equipment and the structure stability.
5. Undertake Performance Assessment / Audit of the service and structures to identify the deficiencies / shortcomings in treating the water.
6. Using best engineering practices with minimal deviation in the basic design of the existing facility shall recommend rehabilitation works to make the WTP in proper functional condition to achieve the specified standards of treated water quality at the outtake of the WTP.
7. Where significant rehabilitation works are inevitably required, the consultant shall perform and rationalize all the factors involved and assure that the rehabilitation / modifications, if any, and harmonized with the existing treatment process to give a quality product.
8. Prepare drawings and documents in line with the available data and superimpose all the modifications, rehabilitation / repair works using latest version of AutoCad. All the lines, levels shall be marked to provide maximum details to give a clear picture of the WTP.
9. Quantify the plants, machineries, equipment, piping system, chlorinators and all the items which need replacement.
10. Provide specifications and standards for the items to be replaced / rehabilitated / repaired.
11. Prepare bill of quantities with item-wise rate analysis / rough estimation to firm up the anticipatory cost of the rehabilitation work.
12. Stability of the existing structure shall be assessed by different authenticated tools and equipment to assure that the structures stands safe for service for another 50 years.
13. Design the protective works to increase the life span of the structures to remain effective and in operation for minimum of 50 years.
14. Prepare and submit the Design Review Report with all probable remedial / rehabilitation works with cost estimation substantiated by rate analysis.
15. Incorporate any views or suggestions in the report beneficial for the project.
16. Perform any or all tasks relevant to the Rehabilitation works which consider to be important and essential for the project.
17. Prepare FIDIC based bidding document including Tender drawings, Tender documents including detailed Bill of quantities supported by well-defined preamble, Engineer estimate supported by cost rationale, technical specifications and standards and any other relevant requirement to meet the WB guidelines.
18. Assess the practical timelines required to physically implement the rehabilitation works using most suitable Project Management Tools and provide critical path to KWSSIP.
19. Identify all the factors and assess the timelines if the bulk water supply through treatment unit / facility will be disturbed during construction phase and suggest any alternate method to continue the uninterrupted water supply to Karachi.
20. Closures if required shall also be assessed.
21. **Construction of New Filtration Plants**
22. Review the Feasibility report for any modification / alteration, if recommended or determined after submission of the Feasibility Study.
23. Physically carry out detailed survey the proposed site and analyze the soil investigation report, geotechnical report and perform any conformity test to ascertain the bearing capacities of the soil.
24. Prepare layout plan with precise lines and levels of different units for the construction of new water treatment plant tied up with the existing facility for proper synchronization.
25. Set out the parameters and the quality of treated water as per applicable standards of potable water.
26. Provide Preliminary design for all the units of the treatment plants including all the processes (chemical, physical), pipelines, plants, machineries and equipment with detailed specifications and standards to be complied with.
27. Specify the designing criteria to facilitate the bidders to understand the project to submit sound technical proposal.
28. Outline the requirement to treat raw water to specified water quality through a comprehensive network properly integrated with each other and dovetailed with the proposed rehabilitation works of the existing rehabilitated.
29. Prepare Bidding documents of EPC mode in line with FIDIC Standard bidding document and the World Bank procurement guidelines.
30. Carryout anticipatory estimation to determine the life-time cost of the project.
31. The existing Filtration process to be replicated for unified quality control. However, the hydraulic and electro-mechanical operations shall be reviewed to deliver “value for money” for client by adopting life-cycle consideration. Physio-chemical processes shall be reviewed to maximize public health benefits. Replacement of gaseous chlorine with liquid hypochlorite has to be looked into.
32. Flood protection system to be designed to safe the utilities from and unforeseen damages during heavy rains in light of the rain pattern for the last 50 years to be obtained from MET, Department.
33. True Bench Mark shall be obtained from Survey of Pakistan and the project controlling points to be clearly mentioned.
34. Energy requirement shall be determined and the provision for the payment to the Power Service provider shall be made in the provisional sum.
35. Details of interconnection (s), if required with the existing treatment units shall be shown on drawings and shall be considered in preliminary design.
36. Any or all the protective works required for the safety of existing treatment facilities shall be assessed and incorporated in the Design parameters.
37. All the underground utilities / services located in the proposed project area shall be marked on the drawings with the protection required during the construction phase.
38. Best globally accepted standards to be adopted framing the specifications.
39. The cost shall be substantiated by rate analysis. Value Engineering should be carried out to determine the most economical design and construction and must be a research-based statistics to authenticate the cost.
40. Using latest project management tools shall assess the most appropriate timelines (Work Program) to complete the project to be used as baseline.
41. Preliminary design complete in all respect including bid documents, drawings, specifications, survey reports and all the information data should be provided.
42. All risk factors shall be mitigated.

**DELIVERABLES:**

By way of illustrations, and not limitation, the reports to be submitted by the Consultants to KWSSIP as part of deliverables under consultancy services will include the following. A common Inception Report for all the assignments will be submitted within given timelines.

| **Description** |
| --- |
| Common Inception Report of Group 3 Works (Part A, B & C) |
| **Feasibility Report**  Performance Assessment Report of all Existing Water Filter Plants depicting present conditions of Electrical, Mechanical and Civil Structure |
| Raw Water and Treated Water Quantification and Quality Report against the specified standards to assess the deficiencies and shortcomings of the existing system |
| Detailed Survey Report on Selection of proposed sites for the construction of New Filter Plants detailing all the environmental and social issues with mitigation plan |
| Geotechnical reports mentioning the soil condition, bearing capacities, bore logs, ground water table etc. |
| Financial & Economical Feasibility Report |
| Feasibility Report. |
| **Rehabilitation Works** |
| Develop the Drawings of the Electrical, Mechanical and Civil Works of the Existing Filter Plants\ |
| Cost estimate of the existing Water Filter Plants, Rehabilitation of Electrical, and Mechanical & Civil Works. |
| Work Plan of the Rehabilitation of Existing Water Filter Plants. |
| Bid documents, drawings, specifications on FIDIC Standard Bidding Documents in line with WB procurement guidelines |
| **Construction Of New Works** |
| Site layout plan for the Construction of New Filter Plants & Reservoirs at different locations. |
| Preliminary / Conceptual Design parameters with specified water quality standards to achieve |
| Lists of specifications of plants, machineries, equipment |
| Bidding documents on EPC mode with detailed outlines of the technical requirements of the project |
| Cost Estimate for New Construction of Filter Plants and Reservoirs. |
| Electrical Load assessment for New Filter Plants. |
| Design Report (Draft) |
| Design Report (Final) |
| Draft Final Report |
| Final Report |
| Prequalification Documents for Rehabilitation of Existing & Construction of New Filter Plants |
| Bidding Documents for Rehabilitation of Existing & Construction of New Filter Plants |
| Other reporting requirements including monthly progress report, presentations, or any other relevant Details / Documents. |