

ISLAMIC REPUBLIC OF PAKISTAN

**THE SECOND KARACHI WATER SUPPLY AND SANITATION
IMPROVEMENT PROJECT (KWSSIP-2).**

Procurement Activity No: PK-PIU 2- 525990-CS-QCBS

**Terms of reference for Consultancy services for Design Review and
Construction Supervision for Priority Water Network, Priority Sewer
Network, Water & Sewerage Services for Low Income Communities &
Detail Design & Construction Supervision of Sectorization in Karachi
for Development of NRW Baseline**

Sub-Project-A	Rehabilitation & Extension of Water Supply and Sewerage Networks in Low Income Communities
Sub-Project-B	Priority Sewer Network Rehabilitation & Extension
Sub-Project-C	Priority Water Network Rehabilitation, Installation of meters for KW&SC & Detail Design of Sectorization in Karachi for Development of NRW Baseline.

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CONTENTS

<i>LIST OF TABLES</i>	1
<i>LIST OF ACRONYMS</i>	2
1 INTRODUCTION	3
1.1 Background	3
1.2 Background on the target Component 2 sub-projects	4
1.3 Rationale for the assignment	7
1.4 Objective of the Assignment	8
2 SCOPE OF THE ASSIGNMENT	8
3 DETAILED DESCRIPTION OF TASKS:	10
3.1 Phase 1a: Design Review and Review & Update of Environment and Social Safeguards (E&S) Documents	11
3.1.1 Task 1: Detailed Engineering Design Review	11
3.1.2 Task 2: Updating the Design, Tender Documents & Preparation of Construction Drawings	12
3.1.3 Task 3: Updating the Existing ESIA / ESMP / RAP	13
3.2 Phase 1b: Detail Design for Potential District Metered Zones	13
3.2.1 Task 1: Detailed Engineering Design.....	14
3.2.1.1 Task 1a: Review of Hydraulic Model and Sectorization Plan	14
3.2.1.2 Task 1b: Hydraulic Model Updating and Calibration	14
3.2.1.3 Task 1c: Detailed Design for Sector Isolation	15
3.2.1.4 Task 1d: Preparation of Detailed Engineering Design, Specifications and Drawings.....	15
3.2.1.5 Task 1e: NRW Baseline Development for Karachi	15
3.2.1.6 Task 1f: Updating Hydraulic Model with Sector Data.....	16
3.2.2 Task 2: Preparation of Tender Documents & Preparation of Construction Drawings	16
3.2.3 Task 3: Preparation of ESIA / ESMP / RAP	16
3.3 Phase 2: Assistance in Tendering Phase	17
3.4 Phase 3: Construction supervision and contract management	18
3.4.1 Verification and Approval of Contractors' Construction Documents	18
3.4.2 Preparation of Detailed Program	19
3.4.3 Pre-Construction and Mobilization Phase	19
3.4.4 Review and Monitor Contractors' Construction, Equipment Supply, Installation and Commissioning Programs and Activities.....	19
3.4.5 Construction phase	20
3.4.6 Works commissioning	22
3.4.7 Progress Monitoring Framework & Reporting.....	22
3.4.8 Liaison and Coordination	23
3.4.9 Quality Control of the Works	24
3.4.10 Review of Contractors' Claims (Payment and Variations)	24
3.4.11 Cost Control.....	25
3.4.12 Health, Safety and Security.....	25

3.4.13	Review Contractors' Submissions after Completion of the Works	29
3.5	<i>Phase 4: Supervision and monitoring of the works during Defects Liability Period</i>	<i>30</i>
4	TIMEFRAME FOR THE ASSIGNMENT	31
4.1	<i>Proposed scheduling of the works for sub-projects A, B and C.....</i>	<i>31</i>
4.2	<i>Estimated time implementation period.....</i>	<i>31</i>
4.3	<i>Deliverables.....</i>	<i>32</i>
4.3.1	Structure and content of the reports/deliverables.....	34
4.3.2	Submission of deliverables	34
5	Consultant qualification.....	34
5.1	<i>Qualifications and experience of key staff.....</i>	<i>34</i>
6	Reporting Requirements/arrangements.....	41
7	Obligations of the Parties	42
7.1	<i>Obligations of the client</i>	<i>42</i>
7.2	<i>Obligations of the consultant</i>	<i>42</i>
8	Payment terms and conditions	43
8.1	<i>Phase 1 and 2 Design Review and Assistance in tender management</i>	<i>43</i>
8.2	<i>Phase 3 and 4: Construction supervision and defects liability period</i>	<i>43</i>
9	ANNEXES.....	44
9.1	<i>ANNEX A: Available information and documentation.....</i>	<i>44</i>
9.2	<i>ANNEXURE-B : KATCHI ABADI MAP (SUB-PROJECT-A).....</i>	<i>45</i>
9.3	<i>ANNEXURE-C : SEWER REHABILITATION MAP (SUB-PROJECT-B).....</i>	<i>46</i>
9.4	<i>ANNEXURE-D : DHABEJI RISING MAIN 1&2 MAP (SUB PROJECT – C)</i>	<i>47</i>
9.5	<i>ANNEXURE-E : SEALING OF JOINTS MAP (SUB PROJECT – C).....</i>	<i>48</i>
9.6	<i>ANNEXURE-F : OPEN CHANNEL FLOW METERS MAP (SUB PROJECT – C)</i>	<i>49</i>
9.7	<i>ANNEXURE-G : OPEN CHANNEL FLOW METERS MAP (SUB PROJECT – C)</i>	<i>50</i>
9.8	<i>ANNEXURE-H : CONSUMER FLOW METERS MAP (SUB PROJECT – C)</i>	<i>51</i>

LIST OF TABLES

Table 1: Sub-Projects Overview	4
Table 2: Scope of consultancy services	8
Table 3: Project Schedule.....	31
Table 4: Required deliverables under the consultancy	32
Table 5: Staff requirement for the project	34
Table 6 Payment terms for Phase 1 & 2: Design Review and Tender Documentation	43

LIST OF ACRONYMS

Acronym	Full Form
ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
BOQ	Bill of Quantities
CERC	Contingent Emergency Response Component
DMA	District Metered Area
DMZ	District Metered Zone
DR&CSC	Design Review and Construction Supervision Consultant
ECNEC	Executive Committee of the National Economic Council
EHS	Environmental, Health and Safety
ES	Environmental and Social
ESF	Environmental and Social Framework
ESHS	Environmental, Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
FIDIC	Fédération Internationale Des Ingénieurs-Conseils (International Federation of Consulting Engineers)
GBV	Gender-Based Violence
GIS	Geographic Information System
GRM	Grievance Redress Mechanism
IBRD	International Bank for Reconstruction and Development
KW&SC	Karachi Water and Sewerage Corporation
KWSC	Karachi Water and Sewerage Corporation
KWSSIP	Karachi Water and Sewerage Services Improvement Project
LMP	Labor Management Procedures
MGD	Million Gallons per Day
MNF	Minimum Night Flow
NOC	No Objection Certificate
NRW	Non-Revenue Water
OHS	Occupational Health and Safety
PAP	Project Affected Person
PC-I	Planning Commission Form-I
PC-III	Planning Commission Form-III
PIU	Project Implementation Unit
RAP	Resettlement Action Plan
ARAP	Abbreviated Resettlement Action Plan
REOI	Request for Expression of Interest
RFB	Request for Bids
RFP	Request for Proposals
ROW	Right of Way
SCADA	Supervisory Control and Data Acquisition
SEP	Stakeholder Engagement Plan
SEPA	Sindh Environmental Protection Agency

1 INTRODUCTION

1.1 Background

Karachi, the largest city in Pakistan, serves as the country's economic and industrial hub. According to the Pakistan Bureau of Statistics (PBS), the population of Karachi exceeds 20 million, making it not only the most populous city in Pakistan but also one of the largest metropolitan areas in the world. The city is known for its cultural diversity, bustling ports, and dynamic urban landscape. As a key center for finance, trade, and media, Karachi plays a vital role in shaping the nation's socio-economic development.

Karachi, has grown so rapidly that it now struggles to deliver basic infrastructure and services, including potable water and wastewater collection and treatment. The Karachi Water and Sewerage Corporation (KW&SC), which is responsible for provision of water and sewerage services in Karachi, is not able to effectively deal with the challenging reality on the ground. There is a huge unmet demand for drinking water supply services (550 MGD current pumping capacity versus an estimated demand of 1200 MGD) coupled with a high non-revenue water (NRW) level estimated at around 50-60 percent of water pumped. There is currently limited sewage treatment, as the greater part of the city's sewage treatment facilities are dilapidated and not working, resulting in a significant quantum of sewage/day being discharged into the Arabian Sea. There has been no significant capital and major repairs and rehabilitation investment for water and sewerage infrastructure for more than a decade. As such, most of the water and sewerage infrastructure is now worn out and operating far below its rated capacity.

There are two different water sources for Karachi City which are the Indus River and the Hub Dam. The total approved water abstraction quota from Indus River is 1200 cusecs (648 MGD) while 185 cusecs (100 MGD) is drawn from Hub Dam. The current combined water supply from both sources has proven to be insufficient to meet the current demand and the needs for the city's expansion in horizontal and vertical dimension. The unprecedented population growth coupled with continuous influx of people from other parts of the country has put KW&SC under tremendous pressure to meet the ever-growing demand for water and sanitation services. Thus, the scarcity and shortage of water is worsening with the passage of time.

To transform KW&SC into a financially sustainable and technically sound water utility and to improve the water and sewerage services delivery levels, the Government of Sindh (GoS) and the KW&SC, with the assistance of World Bank (WB) and Asian Infrastructure Investment Bank (AIIB), have conceived the Karachi Water and Sewerage Services Improvement Program (KWSSIP) to provide clean, safe drinking water and efficient sewerage services to the residents. The Karachi Water and Sewerage Services Improvement Program (KWSSIP) is being implemented by the Government of Sindh (Pakistan) through the KW&SC and a Project implementation Unit (PIU) to manage the series of projects.

The Phase-2 (KWSSIP-2) has been approved by Executive Committee of the National Economic Council (ECNEC) in 2024 amounting to USD 600 Million. The total investments for Phase2 sub-projects will be around

USD 999 million out of which USD 240 million would be funded by IBRD & AIIB each and USD 120 million will be funded by GoS.

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KWSSIP-2 will deepen/strengthen the reforms undertaken in the KWSSIP-1 project and significantly scale-up the infrastructure investments to improve water supply and sewerage services in Karachi City. The investments in the rehabilitation of existing infrastructure and the construction of new infrastructure will enhance the development impacts by reaching more beneficiaries. At the same time, the investments will build support for continued mainstreaming of the operational reforms.

The second phase (KWSSIP-2) consists of four components as outlined below:

- Component 1 – Capacity Building and Reform of KW&SC
- Component 2 –Safely Managed Water Supply and Sanitation Services
- Component 3 – Project Management and Studies
- Component 4 - Contingent Emergency Response Component (CERC)

This assignment targets selected sub-projects under component 2.

1.2 Background on the target Component 2 sub-projects

The summary of the details of the subprojects is presented in Table 1 below.

Table 1: Sub-Projects Overview

	SUB-PROJECT ID	SUB-PROJECT NAME OR TITLE	OUTLINE OF BACKGROUND WORK ON THE SUB-PROJECT
1	A	Rehabilitation of Water Supply and Sewerage Networks in Low Income Communities	The design for this project is already been conducted and submitted by the previous design consultants in 2023.
2	B	Priority Sewer Network Rehabilitation & Extension	The Design Review & Construction Supervision Consultant (DR&CSC) is to carry out complete Design Review using the available design, reports & other documents, highlight the shortcomings, update the design, Bidding Documents & E&S Instruments, provide tendering and procurement support & Construction Supervision.
3	C	Priority Water Network Rehabilitation	
	C1	Providing & Laying 72" (1800mm) Dia two Rising Mains (RM-1 & RM 2) From Phase 2 Pump House at Dhabeji Pumping Complex to Forebay High Point	
	C2	Internal & External Sealing of all joints of Old Pipri Main, New Pipri Main, Korangi Main & New China Main from Pipri Reservoir to Korangi	
	C3	Providing and installing Open Channel Flow Meters on canals in bulk water supply system of Karachi	

	SUB-PROJECT ID	SUB-PROJECT NAME OR TITLE	OUTLINE OF BACKGROUND WORK ON THE SUB-PROJECT
	C4	Installation of Revenue Meters for Bulk Customers of KW&SC	<p>An extensive exercise was already undertaken in KWSSIP-1 for all the consumers meters required to be installed in Karachi. Due to budget constraints, some of the meters were installed in KWSSIP-1 whereas the rest were to be installed under KWSSIP-2. The previous design shall be provided to DR&CSC for review & update along with updating the bidding documents & E&S Instruments, provide tendering and procurement support & Construction Supervision. Approximately, budget of the works contract of this project is USD 5 Million.</p>
	C5	Detail Design of District Metered Zones/District Metered Areas	<p>The consultancy will review and validate the hydraulic model of Karachi's water supply system with sectorization prepared under KWSSIP-1 and update/calibrate it using field and flow data. Based on the validated model, the consultant will design sectorization (DMAs/PMA's or zones or sectors), prepare detailed engineering designs, drawings, and bidding documents for implementation.</p> <p>The consultant will also support procurement, supervise construction, and establish the baseline for Non-Revenue Water (NRW) in Karachi through sector flow analysis.</p>

Component 2 has a number of sub-projects that focus on infrastructure investments (rehabilitation and expansion), procurement of equipment and other associated activities. The three sub-projects that are relevant to the consultancy services to be procured through these terms of reference are outlined below:

Sub-Project A-Rehabilitation & Extension of Water Supply and Sewerage Networks in Low Income Communities in Karachi, Pakistan.

Sub-project A will involve the rehabilitation & Extension of water supply and sewerage system in low-income communities of Karachi in order to develop and or improve the water and sewerage facilities and services in identified project areas. This will provide better hygienic & environmentally friendly atmosphere for the residents of regular Katchi Abadies / Low-income areas for improved socio-economic growth of the inhabitants.

This sub-component will finance the expansion of safe drinking water and sanitation services in identified Katchi Abadis, benefiting over half a million people. Investments will include rehabilitation and expansion of water distribution systems, installation of ILC units, metered house connections, sewerage network rehabilitation and expansion, and accompanying social marketing and WASH behavior change communication. The KWSC will deliver services in partnership with local non-governmental organizations and community-based entrepreneurs as well as local women's organizations and transgender people's organizations.

The Supervision consultant shall review the available existing detail designs, cost estimates, drawings prepared by previous consultant and propose any changes deemed necessary for the proper execution of the project. The consultant shall review all design details & drawings to confirm that sufficient details have been provided for construction. During the Construction Period, the Consultant shall be designated as the Consultant/Project Manager or as the case may be based on provisions of the Contract. The Consultant shall assist the Client in all aspects of supervision of the construction of the works in accordance with sound technical, administrative, financial, and economic practices, and in accordance with the duties and responsibilities assigned to him. The Consultant shall observe that the correction of defected works is satisfactory during the Defect Liability Period. The Consultant shall provide necessary resources so as defects are detected as early as possible and corrections are realized on time by the Contractors, continuous reporting is expected during this stage.

The low-income communities to be tendered out in KWSSIP-2 shall be finalized after social assessment conducted by another consultant hired under KWSSIP. please note that this can alter the scope of the project.

The Katchi Abadis are located in Central, East, Malir & Korangi District. The location map is annexed in Annexure-B.

Sub-project B- Priority Sewer Network Rehabilitation & Extension in selected districts in Karachi, Pakistan

Sub-project B will finance the rehabilitation and extension of priority sewers in selected areas of Karachi to improve the sewer network in line with the plan formulated for the improvement in Sewerage infrastructure of Karachi with regards to both quantity and quality.

This sub-component will finance priority sewerage network rehabilitation and expansion to restore network integrity in critical areas and reduce sewer overflows and flooding that currently impact an estimated 3.02 million people in these areas. The networks for rehabilitation have been identified based on levels of deterioration, under-sizing, and combined sewer/ open channel sewers. These sewers carry wastewater to TP-I and TP-III, which are under rehabilitation by the KWSC.

The consultant shall review the available existing detail designs, estimates, drawings and propose any changes deemed necessary for the proper execution of the project. The consultant shall review all design

details & drawings to confirm that sufficient details have been provided for construction. During the Construction Period, the Consultant shall be designated as the Consultant/Project Manager or as the case may be based on provisions of the Contract. The Consultant shall assist the Client in all aspects of supervision of the construction of the works in accordance with sound technical, administrative, financial, and economic practices, and in accordance with the duties and responsibilities assigned to him. The Consultant shall observe that the correction of defected works is satisfactory during the Defect Liability Period. The Consultant shall provide necessary resources so as defects are detected as early as possible and corrections are realized on time by the Contractors, continuous reporting is expected during this stage.

The sewer schemes are located in East, Orangi & South Districts. The location map is annexed in Annexure-C.

Sub-project C- Priority Water Network Rehabilitation, Installation of meters for Karachi Water Supply and Sewerage Corporation (KW&SC) & Detail Design of DMA/DMZ's for Karachi

Sub-project C involves Priority Water Network Rehabilitation comprising of replacement of rising mains, sealing of joints, assistance in procurement & design & supervision of installation of open channel and consumer meters along with hydraulic model validation, design of sectors or zones, preparation of detailed engineering designs, drawings, and bidding documents for implementation of DMAs/PMAs or sectors or sectors previously designed by another consultant for NRW baseline. Activities under this sub-project are in line with the plan formulated for the infrastructure improvement to ensure improved water services in Karachi with regards to both quantity and quality, and establish a foundation for up scaling.

The consultant shall review the available existing detail designs, estimates, drawings and propose any changes deemed necessary for the proper execution of the project. The consultant shall review all design details & drawings to confirm that sufficient details have been provided for construction. During the Construction Period, the Consultant shall be designated as the Consultant/Project Manager or as the case may be based on provisions of the Contract. The Consultant shall assist the Client in all aspects of supervision of the construction of the works in accordance with sound technical, administrative, financial, and economic practices, and in accordance with the duties and responsibilities assigned to him. The Consultant shall observe that the correction of defected works is satisfactory during the Defect Liability Period. The Consultant shall provide necessary resources so as defects are detected as early as possible and corrections are realized on time by the Contractors, continuous reporting is expected during this stage.

Dhabeji & Keenjhar Lake are located in Thatta District. The location map is annexed in Annexure-D to G.

1.3 Rationale for the assignment

Detailed designs, specifications, drawings and tender packages and associated safeguards documents were prepared with the support of previous consultants in 2023 for all sub-projects. The client now requires the services of a Design Review & construction supervision consultant to review the designs, identify shortcomings, rectify them, prepare the construction drawings & assist the client in the implementation of these packages.

1.4 Objective of the Assignment

The objective of the assignment is to provide services for:

- i. Comprehensive Design review for Sub-projects A, B, and C & detail design for Sub-Project C5.
- ii. Updating and finalizing the designs and bidding package including cost estimates, specifications and drawings (Preparation of these documents for Sub-Project C5)
- iii. Updating & finalizing Environment and Social Safeguards (E&S) Instruments (Preparation of these documents for Sub-Project C5)
- iv. Assist the client in the tender process to hire contractors
- v. Provide construction supervision and project/contract management services for Sub-Projects A, B and C.

2 SCOPE OF THE ASSIGNMENT

The nature and scope of consultancy services required for the assignment is summarized in Table below.

Table 2: Scope of consultancy services

Sub-project No.	Sub-project Part	Name of Sub Project(s)	Scope of consultancy services
1	A	Rehabilitation of Water Supply and Sewerage Networks in Low Income Communities. Laying of water pipelines approximately 150Km with diameters ranging from 75mm to 450mm HDPE pipes Laying of sewer pipelines approximately 100Km in length with diameters ranging from 200mm to 550mm uPVC & RCC pipes.	Carry out Design Review using the existing design simulation models, reports & other documents from the detail design conducted by design consultants, Update the Bidding Documents & E&S Instruments, provide tendering and procurement support & Construction Supervision
2	B	Priority Sewer Network Rehabilitation & Extension Laying of sewer pipelines approximately 66Km in length with diameters ranging from 250mm to 1400mm PVC lined RCC pipes	Carry out Design Review using the existing design simulation models, reports & other documents from the detail design conducted by design consultants, Update the Bidding Documents & E&S Instruments, provide tendering and procurement support & Construction Supervision
3	C1	Providing & Laying 72" (1800mm) Dia two Rising Mains (RM-1 & RM 2) From Phase 2 Pump House at Dhabeji	Carry out Design Review using the design simulation models, reports & other documents from the detail design

Sub-project No.	Sub-project Part	Name of Sub Project(s)	Scope of consultancy services
C		Pumping Complex to Forebay High Point Replacement of 2 rising mains at Dhabeji which are PRCC & 4.5Km in length	conducted by design consultants, Update the Bidding Documents & E&S Instruments, provide tendering and procurement support and Construction Supervision and contract management.
	C2	Internal & External Sealing of all joints of Old Pipri Main, New Pipri Main, Korangi Main & New China Main from Pipri Reservoir to Korangi Sealing of 9300 joints for PRCC pipes length of 45Km in total (OPM, NPM, Korangi main, etc.) with diameters ranging from 33" to 66"	Carry out Design Review using the design simulation models, reports & other documents from the detail design conducted by design consultants, Update the Bidding Documents & E&S Instruments, provide tendering and procurement support and Construction Supervision and contract management.
	C3	Installation of Open Channel Flow Meters on canals in bulk water supply system of Karachi Open channel flow meters Radar type at 4 locations in Bulk system	Carry out Design Review and update the meter specifications, meter installation arrangements and associated fittings etc. Update the Bidding Documents including drawings and specifications and E&S Instruments. The DR&CSC will also provide tendering and procurement support and Construction Supervision and contract management. The meters will be procured as goods in a separate contract or under the works contract.
	C4	Installation of Revenue Meters for Bulk Customers of KW&SC (As per the feasibility report, the previous consultant has identified around 7500 consumer meters. Out of which, 4333 meters are being catered in KWSSIP-1 and it is anticipated that the remaining meters will be installed under KWSSIP-2)	Carry out Design Review and update the meter specifications, meter chambers, installation arrangements and associated fittings etc. Update the Bidding Documents including drawings and specifications and E&S Instruments. The DR&CSC will also provide tendering and procurement support and Construction Supervision and contract management. The meters will be procured as goods in a separate contract or under the works contract.

Sub-project No.	Sub-project Part	Name of Sub Project(s)	Scope of consultancy services
	C5	Detail Design of District Metered Zones/District Metered Areas	The consultancy will review and validate the hydraulic model of Karachi's water supply system with sectorization prepared under KWSSIP-1 and update/calibrate it using field and flow data. Based on the validated model, the consultant will design sectorization (DMAs/PMAs), prepare detailed engineering designs, drawings, and bidding documents for implementation. The consultant will also support procurement, supervise construction, and establish the baseline for Non-Revenue Water (NRW) in Karachi through sector flow analysis.

The scope of work is divided into four (4) phases as follows:

- **Phase 1a:** Design Review and Update of Environment and Social Safeguards (E&S) Documents
- **Phase 1b:** Detail Design of Sectors as defined in KWSSIP-1 by NRW consultant in Karachi for NRW baseline
- **Phase 2:** Assistance in Tender Management
- **Phase 3:** Construction Supervision and Contract Management
- **Phase 4:** Supervision and monitoring of the works during Defects Liability Period

Phase 1 and Phase 2 shall be implemented through a **lump sum contract** while Phase 3 and 4 will be implemented as a **time-based contract**.

Proceeding to Phase 3 & 4 shall be subjected to satisfactory performance by the consultant during Phase 1 & 2. The Client may assess the performance of the consultant in Phase 1 taking into account among other things the quality of deliverables & performance, responsiveness, time management, etc.

3 DETAILED DESCRIPTION OF TASKS:

This section covers sub-projects and parts that will require design review and construction supervision.

The DR&CSC shall provide services for design review and construction supervision by carrying out the following tasks and activities, but not limited to:

3.1 Phase 1a: Design Review and Review & Update of Environment and Social Safeguards (E&S) Documents

3.1.1 Task 1: Detailed Engineering Design Review

The Design Review and Construction Supervision Consultant (DR&CSC) shall review the existing detailed designs, simulation models, estimates, drawings prepared by previous design consultant and propose any changes deemed necessary for the proper execution of the project corresponding to projects under Component A, B & C. The DR&CSC shall review all design details & drawings to confirm that sufficient details have been provided for construction. The DR&CSC shall incorporate all required or proposed design changes and prepare construction drawings that reflect these modifications. The DR&CSC shall also update all relevant documents accordingly.

The DR&CSC shall be responsible to conduct but not limited to the following activities:

- i. Collect all available data, information, reports, detailed design with the coordination of KWSSIP/KW&SC team
- ii. Review all the available records pertaining to Detail Designs (assumptions, inputs, calculations, simulations/modelling, results and outputs including sizes, capacities, materials and key dimensions of the proposed infrastructure) for each of the sub projects.
- iii. Review all available surveys including Topographic survey, soil investigation, etc., identify missing information (if any) to re-affirm with contractor in joint survey.
- iv. Review, assess the existing design and analyze the capacity, performance of the water supply and sewerage network within the project scope by means of studying all available surveys, drawings, investigations & data using simulation models
- v. Study and analyze the hydrological assessment carried out in previous studies.
- vi. Review the structural design, details drawings & E&M design for the sub projects and update if required
- vii. The DR&CSC shall review the drawings prepared by the previous design consultant and incorporate any gaps and required modifications into the tender and construction drawings...
- viii. Review of all related Environmental & Social Safeguards Instruments, identifying shortcomings if any and update if required
- ix. Review of Consultant's Cost Estimates and Economic & Financial Analysis incorporating all modifications of design if any, environmental & social cost with Rational of prices for the best optimal & efficient Design for the proposed project.
- x. Review of Operation & Maintenance (O&M) capacity calculations & cost estimate of the proposed sub project
- xi. Review of all required Documents / Reports if required related to the proposed Project including B.O.Qs, Specifications & Tender Documents. The Tender Documents will be prepared in following World Bank Procurement Guidelines and standard bidding documents.
- xii. The DR&CSC shall review all necessary Approvals / NOC's/ Permissions/ ROW, etc required during the currency of the Proposed Project from Government / all Regulatory Bodies or any relevant Authority.

- xiii. The DR&CSC will review previous findings, assess metering status, and analyze customer categories to confirm objectives like billing accuracy. Each connection will be mapped via GIS and verified through site visits to assess installation conditions and constraints. Suitable meter types, sizes, and features (tamper-proofing, remote reading) will be selected, and installation zones will be proposed. Standard drawings, communication systems integration will be developed along with detailed BoQs, costs, and compliance with relevant/applicable standards.
- xiv. Prepare a Design Review Report identifying the shortcomings, missing elements, modifications, if required, to make the design technically and financially viable and sound.

3.1.2 Task 2: Updating the Design, Tender Documents & Preparation of Construction Drawings

Under Task 2, the DR&CSC shall update the design in light of design review report along with all the preparation/updating¹ of relevant documents such as, REOIs/RFBs, Bid Documents, specifications, BOQ's, Tender drawings, E&S Documents, cost estimates, simulation models etc. Depending on the updated cost estimates, the client may request the DR&CSCs to prioritise preparing bidding documents for works whose estimates are within the available budget.

- i. The DR&CSC shall update/prepare the REOI/RFB, Bid documents, Specifications, etc.
- ii. The DR&CSC shall also update the tender drawings with cost estimates, simulation models and all related documents.
- iii. The DR&CSC shall prepare the Construction Drawings in accordance with the applicable Standards and shall complete and deliver the same to the Client from time to time within the Construction Time for Completion. The drawings shall have adequate details and specifications needed for execution of the works.
- iv. The Client shall have the right to review and inspect all Construction Drawings.
- v. The DR&CSC shall take into account the location and need for relocation of existing in-planned services during update of the design.
- vi. The DR&CSC shall have the overall responsibility for coordination and seeking agreement on swift relocation of utilities shall lie with the DR&CSC. After the confirmation of the existing utilities with the respective agency encountered in the right of way of the Project, the DR&CSC shall prepare the typical cross-section of road with respect to the relocation of utilities. As needed, the supervision DR&CSC shall identify the locations for inspection pits to be installed by the contractor for verification of the underground utilities.

The Construction Drawings to be submitted by the DR&CSC to the client shall include but not limited to the following details:

- i. Alignment of the pipeline;
- ii. Plan and profile/longitudinal section drawings of pipeline along with cross sectional details & existing utilities;
- iii. Detailed structural layout drawings including Bar/steel Bending Schedules;

¹ In case of any change in alignment, areas, the need for redesign shall be discussed, agreed & approved with the client.

- iv. General/Standard drawings such as trench details, thrust boring, chamber details, Naala/Stream crossings, road restoration drawings, valve details, manhole details, junction details, sewer outfall details, interconnection drawings, etc.
- v. Detail drawings such as meter chambers, Over Head Water Tank, Underground Water Tank, Pumping Stations, control rooms, manhole details, general drawings, etc.
- vi. Detailed Electrical & Mechanical drawings including pipe schedule, single line diagrams, etc.
- vii. Construction drawings required for the installation of meters for KW&SC include detailed site layout plans indicating the location of meter chambers, pipe routing, valve arrangements, and connection points to existing infrastructure. The DR&CSC shall prepare standard drawings for different type of meters depending upon depth of the chambers. They also feature sectional views of meter installations showing the configuration of inlet and outlet valves, strainers, bypass arrangements, and access provisions for maintenance. Electrical schematics may be included for smart meters with remote data transmission capabilities. The drawings must conform to KW&SC's specifications and allow sufficient space for future upgrades or replacement, ensuring proper alignment, flow direction, and protection from tampering or environmental damage. These detailed construction drawings serve as the foundation for precise installation and long-term operational reliability of the revenue metering system.

The submission of the Construction Drawings duly signed and stamped shall constitute the representation of the DR&CSC conforming that the DR&CSC has verified that the Construction Drawings submitted are in conformity with the Design Requirements.

3.1.3 Task 3: Updating the Existing ESIA / ESMP / RAP

The DR&CSC will review and update the ESIA, ESMP, and RAP based on site conditions and stakeholder feedback. Key revisions will include refined mitigation measures, updated baseline data, and alignment with regulatory requirements.

In case any significant changes are identified during the design review, the DR&CSC shall update the existing ESIA, ESMP, and RAP for the project to account for those changes in consultation with the E&S team and in accordance with ToRs prepared by the PIU E&S team and cleared by the World Bank. The format and content of the ESIA will adhere to both World Bank and SEPA requirements. As part of this update, the DR&CSC may need to conduct additional baseline sampling and monitoring, particularly for water, wastewater, soil, air quality and noise, where applicable. Additionally, in case of any design changes, the DR&CSC will update the additional resettlement/relocation impacts. If significant design changes result from the review, the DR&CSC will also assist the Client in fulfilling SEPA requirements. The DR&CSC will review the locations of underground and overhead tanks in Katchi Abadis,

Given the limitations of the Environmental and Social Management Plan (ESMP), the DR&CSC shall be required to carry out a comprehensive review and update of the environmental baseline data.

The ESMP will be revised as per the updated information.

3.2 Phase 1b: Detail Design for Potential District Metered Zones

The Consultant shall carry out, but not be limited to, the following tasks.

3.2.1 Task 1: Detailed Engineering Design

The present consultancy assignment will utilize the hydraulic model prepared by the NRW Consultant and undertake the following:

- Review and validate the hydraulic model(s)
- Design the physical isolation of sectors/zones.
- Prepare detailed engineering designs and drawings.
- Prepare bidding documents for civil and mechanical works
- Support procurement and tender evaluation
- Supervise construction and implementation
- Establish the baseline for NRW in Karachi based on flow & pressure analysis and sector monitoring
- Update and calibrate the hydraulic model during implementation

3.2.1.1 Task 1a: Review of Hydraulic Model and Sectorization Plan

The Consultant shall review the hydraulic model prepared by the NRW Consultant and verify its suitability for design and implementation.

Activities include:

- Review model structure, assumptions, and calibration.
- Verify network data including:
 - Transmission mains
 - Reservoirs
 - Pumping stations
 - Valves and control devices
- Review proposed sectorization layout
- Conduct field verification where required.
- Identify gaps and recommend improvements.

3.2.1.2 Task 1b: Hydraulic Model Updating and Calibration

The Consultant shall refine and calibrate the hydraulic model using available and newly collected field data. In this case, there shall be available data from meters that shall be installed on bulk transmission lines under KWSSIP-1.

Activities:

- Update network data and asset information.
- Incorporate SCADA/flow meter data where available.
- Conduct field flow and pressure measurements.
- Perform model calibration for:
 - Peak demand
 - Minimum night flow
 - Average demand conditions

- Simulate different operational scenarios.

3.2.1.3 Task 1c: Detailed Design for Sector Isolation

Based on the validated hydraulic model, the Consultant shall design the physical isolation of each sector.

Activities include:

- Define boundaries of sectors.
- Identify required interventions including:
 - Boundary valves
 - Bulk flow meters
 - Pressure reducing valves
 - Control valves
 - Pipeline modifications
- Design sector inlet and outlet arrangements.
- Ensure each sector can be hydraulically isolated.
- Design pressure management systems where required.

3.2.1.4 Task 1d: Preparation of Detailed Engineering Design, Specifications and Drawings

The Consultant shall prepare detailed engineering designs for implementation.

Activities include:

- Hydraulic calculations
- Detailed pipeline modifications
- Valve chamber designs
- Meter installation designs
- Civil structures
- Instrumentation layout
- SCADA integration requirements

Drawings shall include:

- Sector boundary maps
- Valve installation drawings
- Flow meter chamber drawings
- Pipe modification drawings
- Sector control layouts.

3.2.1.5 Task 1e: NRW Baseline Development for Karachi

The Consultant shall establish a baseline for NRW in Karachi based on sector analysis.

Activities include:

- Analyze flow measurements in each sector.
- Determine:
 - Minimum Night Flow (MNF)
 - System Input Volume (SIV)
 - Billed Authorized Consumption
- Estimate:

- Physical losses
- Commercial losses
- Develop sector-wise NRW indicators.

3.2.1.6 Task 1f: Updating Hydraulic Model with Sector Data

After implementation of sector isolation:

- Update the hydraulic model with actual network configuration.
- Integrate field monitoring data.
- Validate sector performance.
- Provide operational optimization recommendations.

The rest of the tasks shall include the preparation of bidding documents, cost estimates, tendering assistance & construction supervision as defined for other sub-projects.

3.2.2 Task 2: Preparation of Tender Documents & Preparation of Construction Drawings

Same as section 3.1.2

3.2.3 Task 3: Preparation of ESIA / ESMP / RAP

The Consultant shall conduct comprehensive Environmental and Social (E&S) safeguard studies to ensure that the proposed interventions align with national regulations and international best practices, including the World Bank Environmental and Social Framework (ESF) and relevant Environmental, Social, Health, and Safety (ESHS) standards. The studies shall also include Resettlement Planning to address potential displacement impacts and it also include the gender action plan to address the vulnerable communities issues during the project implementation. The scope of these studies shall include, but not be limited to, the following:

Environmental and Social Safeguard Studies:

- i. **Screening and Scoping:** Conduct environmental and social screening to identify potential impacts and determine whether an Environmental and Social Impact Assessment (ESIA), an Environmental and Social Management Plan (ESMP) including Gender Action Plan, a Resettlement Action Plan (RAP), or an Abbreviated Resettlement Plan (ARP) is required, based on site-specific conditions.
- ii. **Baseline Assessments:** Collect and analyze data on environmental and social conditions, including air quality, water quality, noise levels, soil characteristics, biodiversity, socio-economic conditions, and vulnerable populations within the project area.
- iii. **Environmental and Social Impact Assessment (ESIA) or Environmental and Social Management Plan (ESMP):** Depending on the screening outcome, either an ESIA or an ESMP will be prepared to assess potential environmental and social impacts and propose mitigation measures in compliance with SEPA and World Bank requirements.

- iv. **Climate Resilience and Adaptation Measures:** Assess climate change risks and propose adaptive measures to ensure project resilience against extreme weather events, floods, and water scarcity.
- v. **Environmental and Social Management and Monitoring Plan (ESMMP):** Develop a detailed ESMMP with all necessary plans including but not limited to Traffic Management Plan, Waste management Plan, Health and Safety Plan etc. Outlining mitigation measures, monitoring protocols, and responsibilities to ensure compliance with environmental and social safeguards throughout the project lifecycle.
- vi. **Compliance with Regulatory Approvals:** Ensure compliance with SEPA's environmental and social approval processes and assist the Client in obtaining necessary clearances and permits.

Resettlement Planning

- i. **Social Screening and Stakeholder Mapping:** Identify key stakeholders, project-affected persons (PAPs), and vulnerable groups, and assess potential social risks.
- ii. **Resettlement Action Plan (RAP) or Abbreviated Resettlement Plan (ARP):** Prepare a RAP or ARP, as required, in accordance with the World Bank's Involuntary Resettlement Policy, detailing compensation measures and livelihood restoration strategies for displaced persons.
- iii. **Gender Analysis and Action Plan:** Assess gender-specific impacts and develop targeted interventions to promote gender inclusivity in project activities, ensuring compliance with the Gender Action Plan (GAP).
- iv. **Stakeholder Engagement and Public Consultation:** Develop Stakeholder Engagement Plan (SEP) for the E&S Implementation in the safeguard studies in line with the already developed SEP of KWSSIP to ensure continuous community participation, with a focus on vulnerable groups, and maintain proper documentation of all consultations.
- v. **Grievance Redress Mechanism (GRM):** Follow and prepare the project-specific GRM in line with the already established and documented GRM of KWSSIP, including reporting protocols for handling complaints and ensuring confidentiality, particularly for sensitive cases such as Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH).
- vi. **Labor and Working Conditions Compliance:** Ensure adherence to the Labor Management Plan (LMP), monitoring labor conditions, occupational health and safety, and workers' rights at project sites.
- vii. **Cultural Heritage and Indigenous Peoples Considerations:** Identify and mitigate potential impacts on cultural heritage sites in line with the World Bank's ESF.
- viii. **Monitoring and Evaluation Framework:** Develop a monitoring framework with key performance indicators (KPIs) to track environmental and social compliance during project implementation.

The Consultant shall ensure that the findings from these studies are integrated into the design design, aligning with both regulatory requirements and best practices. Additionally, all environmental and social safeguard instruments, including RAP or ARP where applicable, will be documented and submitted to the Client for approval and further processing.

3.3 Phase 2: Assistance in Tendering Phase

The DR&CSC shall also support and assist

- i. Assist client in conducting market outreach if needed to identify the potential bidders available to participate in the proposed bidding of Works /Goods.

- ii. Preparation of Specific Procurement Notice (Advertisement)
- iii. Assist the client in organizing Pre-Bid Meetings with response to the bidder's queries and timely issuance of Minutes of Meetings.
- iv. Assist client to ensure that during the tendering process the provisions of World Bank Procurement Regulations are maintained in letter and spirit with Audit perspective.
- v. The DR&CSC shall assist the client in responding to all the queries related to the design and bidding documents raised by the interested bidders during bidding period
- vi. Assist in organizing the site visits if required for prospective bidders
- vii. Preparation of clarifications and addenda to the bidding documents, if needed
- viii. Scrutinize and evaluate all proposals/tenders / bids along with the preparation of Bid Evaluation report as per World Bank procurement regulations.
- ix. Preparation of draft contract
- x. Negotiation of contract Regulations.

3.4 Phase 3: Construction supervision and contract management

During the Construction Period, the DR&CSC shall be designated as the Consultant or as the case may be based on provisions of the Contract. The DR&CSC shall assist the Client in all aspects of supervision of the construction of the works in accordance with sound technical, E&S, administrative, financial, and economic practices, and in accordance with the duties and responsibilities assigned to him. The DR&CSC shall perform all duties and tasks to ensure that the best construction practices are followed and that the works are completed within the allocated Budgets and Construction Delivery Periods, and in all respect equal to or better than the minimum specified, at the most economic costs, and is executed in full compliance with the Contract Documents. The DR&CSC, as Employer's Representative, shall administer and supervise the Contractor to ensure the timely completion of the works, that the works are carried out in accordance with the approved designs, specifications and drawings, and that the quality of works meets the standards and specifications required in the technical documents. The DR&CSC will assist client in preparation of Revised PC-I, PC-III, PC IV of the sub-project.

The basic DR&CSC/Consultant's supervision tasks envisaged for the project shall include, but not be limited to, the following:

3.4.1 Verification and Approval of Contractors' Construction Documents

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

- i. Review and recommend for approval of the Contractors' work statements/ methodologies, CESMPs, material and equipment sources, quality of material and equipment, testing of construction materials, testing of key equipment, to ensure the conformability to the specifications, safety, and performance requirements.
- ii. The DR&CSC site supervision teams shall review and check all construction documents covering the temporary and permanent works. This review shall check for:
- iii. Compliance with contractual requirements and applicable laws,

- iv. Adherence to codes and standards,
- v. Technical correctness and completeness,
- vi. Reliability, operability (ease of operation), durability (service life) and maintainability (ease of maintenance).
- vii. The DR&CSC shall review all Contractors' submittals and advise the Contractors of any need to modify or revise them.

3.4.2 Preparation of Detailed Program

The DR&CSC shall submit a detailed work plan and construction methodology for Client approval, outlining all project activities and quality assurance measures. The program must be prepared using approved project management software as Primavera or MS Project. It should include timelines for interfacing activities, submittals, and reviews. The initial plan must be submitted within two weeks of contract award, with revisions due within two weeks of Client feedback.

3.4.3 Pre-Construction and Mobilization Phase

- i. Preparing and updating Construction Drawings as required after endorsing joint survey
- ii. Review and approve the design works carried by the Contractors if any
- iii. The DR&CSC will be required to coordinate and resolve the interface issues at different construction as well as with authorities and utility agencies.
- iv. The DR&CSC shall review and approve CESMPs submitted by the contractor and submit it to PIU KWSSIP for further clearance.

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

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

- i. Review and recommend for approval the Contractors' construction planning and programs, and monitor construction progress for early detection of potential delays
- ii. Prepare consolidated construction programs showing interfaces between different construction contracts, and between civil and mechanical/electrical works
- iii. Ensure compatibility between civil and mechanical/electrical works/E&S compliance.
- iv. Coordinate civil work activities between Contractors to prevent delays and disruption and avoid claims by Contractors
- v. The DR&CSC site supervision teams shall review, monitor and comment on all Contractors' construction equipment supply, installation and commissioning programs, and activities including but not limited to:
- vi. Contractors' site management team including E&S team, construction experience, management capability, manpower and mobilization plan.

- vii. Contractors' material mobilization plan.
- viii. Contractors' construction progress plan and milestone plan, etc.
- ix. Contractors' construction technical measures.
- x. Contractors' construction procedure and construction methods.

3.4.5 Construction phase

- i. Review and approve the construction methodology prepared by the contractor.
- ii. Examine and approve the construction program proposed by the Contractors and ensure systematic and periodic feedback and the regular updating of the construction program and resource allocations;
- iii. Review all the submittals from the Contractors including, but not limited to materials, shop drawings, organization plans, program and planning schedule(s) etc. ensuring that the all meet the Contract specifications and Client requirements;
- iv. The DR&CSC shall ensure that all related materials and equipment forming a major part of the works are procured in a timely manner following the procurement schedule of materials proposed by the contractor.
- v. Review and assist where needed, and approve the Contractors' proposals related to materials, equipment and methods of construction and advise the Client accordingly;
- vi. Coordinate with other DR&CSC and other authorities with respect to existing services relocation, temporary arrangements, traffic diversion, and infrastructure works in the project area;
- vii. Fulfill the role of DR&CSC as defined in the applicable harmonized FIDIC suites of contracts;
- viii. Ensure compliance with contract terms, including adherence to approved project timelines and cost estimates, review contractor performance and recommend necessary actions to prevent deviations from scope, schedule, and budget.
- ix. Ensure implementation of works Quality Assurance procedures as per the applicable Guidelines and Policies;
- x. Perform quality control and quality assurance activities, follow up and evaluation;
- xi. Reject sub-standard work and document any material or test not in compliance with the contract documents;
- xii. Approve or comment on materials supplied by outside suppliers for incorporation into the works and arrange for any independent tests deemed necessary to ensure compliance with the specifications;
- xiii. In conformity to the overall project span of time the DR&CSC shall prepare a plan on Microsoft Project or Primavera to follow the progress on ground with all the necessary information regularly updated in the software record;
- xiv. Monitor construction methods and operations to ensure compliance with the contract documents (drawings and specifications);
- xv. Ensure that the contractor timely procures and delivers to the site all material and equipment forming the part of works.
- xvi. Ensure deployment of Plant and Equipment, Staff and Labour in adequate number by the contractor with efficient utilization and maintenance of Plant and Equipment in good working condition.
- xvii. Ensure that the Contractors submit all necessary documents such as drawings and material

- submittals, inspection requests and progress reports, etc., for the DR&CSC's approval and monitor the availability of resources, materials and plants and identify any shortage or shortcomings;
- xviii. Monitor the manufacturing and testing of pipes at the manufacturing facilities including the coating of pipes, internal lining of pipes as per the approved standards including witnessing the Factory Acceptance Tests (FAT) with the pipe handling and their transportation to the site of construction.
 - xix. Provide Technical Assistance in the form of Intensive Site Supervision, Contract Administration and office back-up support services during the construction period of the assigned supervision contract;
 - xx. The DR&CSC will ensure quality and quantity of all materials at site. Ensure that the works are carried out in accordance with the provisions of the contract and with professional skill and care for the orderly progress and satisfactory completion of the Project;
 - xxi. Ensure implementation of the ESIA/ESMP and RAP wherever required as per the World Bank Applicable ESF & ESS Safeguard Policies and EHS Guidelines along with E&S team.
 - xxii. Ensure implementation of the Labor Management Procedures (LMP) by the contractors, including but not limited to the signing of the Code of Conduct by all workers, prohibition of child labor, and regular stakeholder engagement activities in accordance with the approved Stakeholder Engagement Plan (SEP).
 - xxiii. Ensure that a functional Workers' Grievance Redress Mechanism (GRM) is established and operational at all project sites, and that surrounding communities are adequately informed and aware of the GRM process and access points.
 - xxiv. Participate as a member of the Damages Claim Committee, review the validity and supporting documentation of each claim, and ensure that compensation is assessed and disbursed in accordance with the approved procedures of the damages claim committee.
 - xxv. Ensure that the Contractors protect antiquities affected by construction works as detailed in the project's Environmental and Social documents including ESMP;
 - xxvi. Ensure implementation of health and safety aspects
 - xxvii. Identify emergency and safety works, and report such cases when needed for fast action;
 - xxviii. Ensure the topographical and geographical data integrity of the entire works;
 - xxix. Manage the Project and administer the Construction Contract(s) on a day-to-day basis;
 - xxx. Carry out field and office back-up consultancy services in coordination with Client for the day-to-day Management of the Project. The time limits established in the construction schedule approved by Client shall not be extended by the DR&CSC without prior approval of Client;
 - xxxi. Document all executed works with Digital Photos and Video Images and submit copies to the Client;
 - xxxii. Assess project risks and take necessary corrective actions to minimize delays and additional costs.
 - xxxiii. Monitor construction progress to ensure compliance with the agreed construction Schedules, identify potential risks that may lead to time and cost overruns and propose mitigation measures;
 - xxxiv. Prepare the Cash Flow Projections for each contract to forecast the funds requirement for the project.
 - xxxv. Advise the Client on contractual issues as well as matters related to policy, programming and cost control;
 - xxxvi. Shall proactively identify the need for Variation Orders (VOs) or No-Cost Extensions (NCEs) well in advance of contract expiration. Requests for VOs or NCEs must be submitted for review no later than fifteen [15] days before the contract expiration date to allow adequate time for approval.
 - xxxvii. Examine and approve the relevant As-Built Drawings submitted by the Contractors or any other

- parties as the work progresses;
- xxxviii. Ensure the satisfactory execution of the Works and timely completion of the same within the planned delivery period and within the contract budget, in accordance with the contractual specifications;
 - xxxix. Ensure that the daily progress of the works on site is maintained, and prepare daily reports (in an approved format) describing the ongoing activities, allocated personnel, work accomplished, resources, shortfalls, deliveries, inspection, survey checks, testing, instructions issued, visits by others, weather conditions etc. and all other events of significance occurring during the day. Using these records, supplemented by field measurements, monthly calculations of quantities of work accomplished by the Contractors shall be compiled as a basis for assessing periodic payments;
 - xl. Maintain information relevant to progress, performance, quality, quantity, resources and cost. This information shall be used in preparing monthly, final measurements, and payment certificates as well as periodic reports;
 - xli. Prepare supervision reports, (as indicated below under the reporting requirements) on works carried out by the Contractors and highlight problems, obstacles, shortcomings and recommendations. The reports shall include information on progress, performance, measurements, quality control, cost data, contractual matters, materials including progress on procurement of key materials and equipment forming the works, resources, manpower, weather conditions, variation orders, E&S compliance status and Head Office staff inputs and site visits. The reports shall also include selected photographs showing various aspects of the works;
 - xlii. Measure the Works as they proceed, review and process Contractors' monthly payments/ Interim Payments, based on the measurements of substantially completed works, bearing in mind the results of inspections and testing;
 - xliii. Services shall be directly linked to the achievement of agreed deliverables, including overall physical progress and certification of works at the site by the contractors. In the event of delays in the completion of works by the contractors compared to the approved schedules, the DR&CSC's payments shall be withheld proportionally to the extent of the delay.
 - xliv. Modifying/updating construction drawings as maybe required depending on site conditions & requirements by any other authorities.
 - xlv. Any other duties & tasks assigned from the client required for effective supervision of construction.

3.4.6 Works commissioning

- i. The DR&CSC shall Supervise Tests at Completion and other relevant Performance Tests. For DMAs, this will include among other activities; network stabilization, PRV setting, DMA validation, zero pressure test, minimum night flow (MNF) analysis and other tests required for proper DMA establishment and resolution of anomalies and problems.
- ii. The DR&CSC shall supervise the commissioning of the works substantially completed under the project requirements;

3.4.7 Progress Monitoring Framework & Reporting

The DR&CSC shall monitor the Contractors' works to determine progress and ensure that the construction

program is maintained and costs minimized by means of, but not limited to, the following activities:

If there is any delay in the progress monitoring compared to the proposed work plan, the DR&CSC must identify the cause of the delay, assign responsibility, and recommend corrective measures to bring the project back on track. Given that the project will be executed in congested urban areas, the DR&CSC is expected to take a proactive approach to prevent delays.

- i. Review and, if in agreement, consent to the Contractors' proposed program of work to meet key dates established in the various contracts;
- ii. Based on the Project's Results Framework, monitor the progress based on respective performance Indicators for progress monitoring, and share with all contractors for assessing their performance on the basis of such approved Key Indicators. Set the Milestones and Performance standards in such Key Indicators.
- iii. Prepare and maintain progress programs for comparison against the agreed "baseline" program in order to monitor and report on progress;
- iv. Develop the Weekly & Monthly based reporting standards and keep tracking all the activities as per approved Work Plan.
- v. Analyze the variations of construction progress from the Contractors' program;
- vi. Monitor the quality of works in accordance with the technical specifications, design requirements, and applicable construction standards. Identify any non-conformities, propose corrective measures, and ensure timely resolution by the contractor.
- vii. Integrate Environmental and Social (E&S) compliance monitoring into the regular progress review process. This includes verifying whether contractors are adhering to approved safeguards instruments such as the ESMP, LMP, SEP, and RAP (where applicable). Any identified non-compliances must be recorded, and necessary corrective actions recommended. Ensure that E&S compliance findings are incorporated in the monthly progress reports submitted to PIU KWSSIP.
- viii. If and when progress falls behind program/ schedule, develop in consultation with the Contractors, for approval by Client, appropriate modifications to programs and/or work methods to recover the original program.
- ix. Ensure that the Contractors' reporting requirements identified in management procedures and ensure that contractor will follow too.
- x. The contractor shall be responsible for preparation of as-built drawings with proper detailing as acceptable to client duly signed by the DR&CSC.

3.4.8 Liaison and Coordination

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

The DR&CSC shall liaise with the all-relevant authorities through the Client to ensure that all necessary

measures are made and properly processed by the Contractors. This will require, but shall not be limited to, coordination with the concerned authorities with respect to: existing services temporary use and/or relocations, temporary arrangements deemed necessary for the project implementation, etc. And other temporary infrastructure works deemed necessary to be completed in the project areas.

3.4.9 Quality Control of the Works

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

- i. Establishing a Quality Assurance Program applicable to the Project and to the approval of the Client;
- ii. Monitoring of quality control and the application of the quality assurance
- iii. program;
- iv. Supervising the civil and electro/mechanical works of the Project to ensure that the works are carried out in accordance with the design and specifications, and that the quality meets the required standards and specifications;
- v. Assess the quality and efficacy of implemented Environmental and Social (E&S) measures to ensure that they are effectively addressing on-ground E&S risks and impacts, and provide feedback for continuous improvement, in coordination with the E&S team.

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

3.4.10 Review of Contractors' Claims (Payment and Variations)

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

- i. Inspect and control quantity of works, check completed works and issue temporary certificates for progress payments. Supervise progress of construction works and certify progress payments for completed works Ensure and verify that the completed works also complied with all applicable E&S conditions.
- ii. Review and assess the Contractors and suppliers' claims on additional works, extension of time and additional payment requests and make recommendations to the Client
- iii. Issue of instructions and variation orders to the Contractors in due consultation with the Client

- iv. After completion of each of the Project's components, and the Project as a whole, prepare reports evaluating quantities, quality and cost of completed works by the Contractors and suppliers in accordance with the contracts;

3.4.11 Cost Control

Monitoring of Contract Costs

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

Claims Management and Variation Orders

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

The DR&CSC shall process in a timely manner and as appropriate certify for payment the Contractors' monthly statements to ensure that such statements reflect works completed.

The statements shall be based on measurements on site. The measurements on site shall be made jointly by the Contractors and the DR&CSC.

3.4.12 Health, Safety and Security

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

Supervise Health and Safety during Construction and Installation

In line with current international practice, the Client assumes that the Contractors will be required to prepare a Health and Safety Plan as part of their Quality Assurance Plan, in line with the WB/IFC Environmental Health and Safety Guidelines and the ESIA/ESMP and Labor Management Plan (LMP) requirements.

It is each Contractor's responsibility to prepare and implement a Health and Safety Plan on-site. The primary aim is to avoid injury or damage to health to any of the Contractors' staff, persons associated with the construction activities, the general public, or anyone entering the work premises.

The DR&CSC shall review and approve the Health and Safety Plan in line with the Labor Management procedures (LMP) of KWSSIP II, produced by the Contractors with respect to the applied WB/IFC guidelines and submit it to PIU. The review shall focus on:

- Compliance with the approved E&S documents and current legislation and codes of practice.
- The Contractors' capability in terms of health and safety including OHS staff.
- The Contractors' procedures for health and safety and hazard identification.
- The Contractors' health and safety training (safety induction).
- Identification and elimination/minimization of hazards.
- The Contractors' compliance with safety rules/ OHS guidelines.
- The Contractors' safety coordination.
- The Contractors' health and safety implementation documentation.
- Corrective actions and improvement requests.
- Implementation of new safety and health initiatives as appropriate.

Supervise the Development of a Security Plan

The DR&CSC shall ensure that security considerations are incorporated into the ESMP and supervise the development of a Security Plan by the contractor. The Security Plan will include risk assessments, emergency response protocols, and mitigation strategies to enhance security measures throughout the project lifecycle. The DR&CSC shall review the Security Plan to ensure alignment with best practices, regulatory requirements, and project-specific risks, ensuring the safety of personnel, assets, and overall project operations.

Supervision of Implementation of Environmental and Social Management Plan

The DR&CSC shall be responsible for overseeing and controlling the implementation of the Project's Environmental and Social Management Plan (ESMP) and providing necessary instructions to the Contractors. The DR&CSC's responsibilities include ensuring that the ESMP, which already outlines the main impacts and control measures identified in the Environmental and Social Impact Assessment (ESIA) study, is properly executed, with particular attention to the following:

- i. Implementing the specified mitigation measures during the construction phase.
- ii. Implementing various site-specific E&S plans in line with the ESIA requirements; such as Waste Management Plan, Traffic Management Plan, Tree Plantation Plan, Emergency Response Plan, HS Plans, Gender Action Plan, Stakeholders Engagement Plans etc.
- iii. Ensuring compliance with relevant control guidelines and standards.
- iv. Managing the responsibilities associated with the ESMP's implementation.
- v. Overseeing verification, monitoring, and training (capacity building) as required.
- vi. Ensuring accurate reporting, record keeping, and documentation throughout the project.

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

- i. Review and approve the Contractor's Environment and Social Management Plan (C-ESMP), including all updates and revisions at frequencies specified in the Contractor's contract (normally not less than once every 6 months); The C-ESMP should include the all aspects of the ESMP.
- ii. Review and approve all other applicable contractor's documents related to ES aspects including the health and safety manual, security management plan and SEA prevention and response action

- plan; and all that plans must be according to the approved ESMP.
- iii. Review and consider the ES risks and impacts of any design change proposals and advise if there are implications for compliance with ESIA, ESMP, consent/permits and other relevant project requirements;
 - iv. Undertake, as required, audits, supervisions and/or inspections of any sites where the Contractor is undertaking activities under its contract, to verify the Contractor's compliance with ES requirements (including relevant requirements on SEA/SH);
 - v. Undertake audits and inspections of Contractor's accident logs, community liaison records, monitoring findings and other ES related documentation, as necessary, to confirm the Contractor's compliance with ES requirements (including relevant requirements on SEA/SH, GBV and child labor);
 - vi. Determine remedial action/s and their timeframe for implementation in the event of a noncompliance with the Contractor's ES obligations;
 - vii. Ensure appropriate representation at relevant meetings including site meetings, and progress meetings to discuss and agree appropriate actions to ensure compliance with ES obligations;
 - viii. Ensure that the Contractor's actual reporting (content and timeliness) is in accordance with the Contractor's contractual obligations;
 - ix. Review and critique, in a timely manner, the Contractor's ES documentation (including regular reports and incident reports) regarding the accuracy and efficacy of the documentation;
 - x. undertake liaison, from time to time and as necessary, with project stakeholders to identify and discuss any actual or potential ES issues;
 - xi. Provide training to the Contractors and Client personnel for ESMP management and monitoring during construction phase;
 - xii. Work with Client's staff for community participation, awareness generation, social inclusion, and implementation of gender action plan;
 - xiii. Assist Client in disseminating information on the Project to various stakeholders of the Project.
 - xiv. Conduct regular consultations with the community and other stakeholders, ensuring that the contractor's E&S team also conducts consultations in accordance with the Bank's requirements. These consultations must include all sensitive receptors identified in the ESIA/ESMP document. Proper documentation of all consultations, including meeting records, participant lists, key discussions, concerns raised, and agreed actions, must be maintained and submitted as part of the project's reporting requirements.
 - xv. Establish and maintain a robust Grievance Redress Mechanism (GRM) to effectively address concerns raised by stakeholders. Special provisions must be in place to protect confidentiality, particularly for individuals reporting allegations of Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH). Additionally, ensure that all necessary grievance committees are established at the site level to facilitate proper grievance management and resolution.
 - xvi. Ensure that the contractors fully comply with the requirements of the KWSSIP's Labor Management Plan (LMP), Gender Action Plan (GAP), and Stakeholder Engagement Plan (SEP). This includes implementing all prescribed measures to safeguard labor rights, promote gender inclusivity, and ensure meaningful stakeholder engagement throughout the project lifecycle.
 - xvii. Carry-out the following activities consistent with the Works contract to be supervised, including

but not limited to the following:

- a) Support the Works employer to organize an SEA/SH conference, ensure appropriate representation in the conference and follow-up on any agreed actions by the attendees;
- b) Monitor contractor's compliance with its SEA/SH Prevention and Response Obligations in the Works contract, and take appropriate contractual actions if non-compliance is identified, including upon identification of potential non-compliance by a dispute board;
- c) Ensure that any allegation of SEA and/or SH that are received by the DR&CSC are documented, maintaining appropriate confidentiality, and promptly submitted to the Employer and the Contractor;
- d) Prior to its engagement for the Works, verify that, any proposed subcontractor not named in the contract, is qualified in accordance with the provisions of the SEA/ SH performance declaration for sub-contractors;
- e) Provide appropriate support and relevant documents that a dispute board may need in reviewing SEA/SH contractual compliance;

During the supervision stage, the key personnel of the DR&CSC will be stationed at Karachi i.e. project location.

RAP/ARAP Implementation Support (if needed)

The DR&CSC shall assist the Client in implementing the RAP and coordinating any necessary livelihood restoration measures with external stakeholders, as outlined in the RAP. Support will include all activities defined by the RAP under the Client's responsibility. Support to the Client shall include:

a. General Tasks

- i. Validation of Project Affected Persons (PAPs) as identified in the ARP/RAP document also identify PAPs whose livelihood will be disturbed during the construction works and prepare a report for that.
- ii. Coordinate the implementation of the RAP with the PIU social expert.
- iii. Ensure the implementation of the livelihood restoration strategy in coordination with the PIU social expert.
- iv. Adapt and implement the Stakeholder Engagement Plan (SEP) and its grievance mechanisms together with the PIU social expert.

b. Database Management

- i. Consolidate and manage all PAP information gathered for the RAP into a database.
- ii. Ensure the inclusion and updating of relevant socio-economic and livelihoods-related data in the database, in coordination with the PIU social expert.
- iii. Monitor RAP and livelihoods progress through the database.
- iv. Track compensation delivery, PAP whereabouts, and socio-economic circumstances throughout the RAP implementation phase.

- v. Develop a monitoring and reporting plan with other PIU experts.
- vi. Regularly report on the progress and outcomes of resettlement activities.
- vii. Respond to requests related to RAP and livelihoods data in relation to the project.

c. Community Liaison During RAP Implementation

- i. Implement the RAP and stakeholder engagement plan, update stakeholder mapping as needed, and devise engagement measures for each stakeholder category and project phase.
- ii. Set up a structured grievance mechanism with clearly defined responsibilities for grievance management steps as detailed in the RAP, including roles for the Client and other stakeholders.
- iii. Coordinate the implementation of the stakeholder engagement plan and grievance mechanism with the PIU social expert.
- iv. Organize consultations and information meetings during RAP implementation with the PIU social expert.
- v. Develop a vulnerable people action plan based on the RAP concepts with the PIU social expert.
- vi. Track compensation delivery and socio-economic measures throughout RAP implementation.
- vii. Respond to requests related to stakeholder, community engagement, and grievance management in coordination with the PIU social expert.

d. Monitoring and Evaluation

- i. Contribute to and ensure the quality control of monitoring reports to track RAP progress, in coordination with PIU experts.
- ii. Contribute to and ensure the quality control of the RAP completion report when compensation payments are finalized. If necessary, assist in preparing a residual action plan for livelihood restoration measures after compensation payments are completed.

Co-ordination with Authorities and Contractors

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

3.4.13 Review Contractors’ Submissions after Completion of the Works

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

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

- ii. Check and recommend for approval of as-built drawings after completion of the works. List down all changes to the approved Technical Design or approved Working Drawings.
- iii. Check before acceptance of all works at different stages, parts and equipment and the Project as a whole on completion.
- iv. Inspect of completed works and issue certificates of completion
- v. Inspect the works at appropriate intervals during the defects liability period and prepare the Defects Liability Certificate.

3.5 Phase 4: Supervision and monitoring of the works during Defects Liability Period

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

- i. The DR&CSC/Project Manager shall be responsible to issue Defect Liability Certificate upon completion of works.
- ii. The DR&CSC will assist client in preparation of Revised PC-I, PC-III, PC IV of the sub-project.
- iii. Upon submission of Final Account by the contractor shall review and issue Final Payment Certificate.
- iv. Approve the as-built drawings initially prepared by the Contractors at the end of construction;
- v. Prepare the detail Punch list and identify all related defects or minor repair works to be addressed by the contractor during the Defect Liability Period
- vi. The DR&CSC/Project Manager shall certify that all defects identified and notified during the Defect Liability Period are corrected to the satisfaction of the DR&CSC.
- vii. Supervising the commissioning of all equipment, structures and plants;
- viii. Preparing and submitting to Client inspection and test reports and certificates of acceptance.
- ix. The Consultant/Project Manager shall propose a comprehensive mechanism for the handing/taking over of works by the employer.
- x. The Consultant shall observe that the correction of defected works is satisfactory during the Defect Liability Period. The DR&CSC shall provide necessary resources so as defects are detected as early as possible and corrections are realized on time by the Contractors; continuous reporting is expected during this stage.
- xi. The O&M manual shall be prepared by the contractor but will be reviewed and approved by the DR&CSC.

4 TIMEFRAME FOR THE ASSIGNMENT

4.1 Proposed scheduling of the works for sub-projects A, B and C

Table 3: Project Schedule

PROJECT SCHEDULE									
S. No	Project Components	Year 1		Year 2		Year 3		Year 4	
A)	Rehabilitating water supply and/or sewerage in selected low-income communities.								
B)	Priority Sewer Network Rehabilitation and Extension								
C1	<i>Providing & Laying 72" (1800mm) Dia two Rising Mains (RM-1 & RM 2) From Phase 2 Pump House at Dhabeji Pumping Complex to Forebay High Point</i>								
C2	<i>Internal & External Sealing of all joints of Old Pipri Main, New Pipri Main, Korangi Main & New China Main from Pipri Reservoir to Korangi</i>								
C3	<i>Installation Open Channel Flow Meters on canals in bulk water supply system of Karachi</i>								
C4	<i>Installation of Revenue Meters for Bulk Customers of KW&SC</i>								
C5	<i>Detail Design of District Metered Zones/District Metered Areas</i>								
DESIGN REVIEW, UPDATE OF E&S									
DETAIL DESIGN OF DMA/DMZ's									
ASSISTANCE OF TENDER MANAGEMENT									
CONSTRUCTION SUPERVISION PERIOD									
DEFECT LIABILITY PERIOD									

Note

Please note that the services required for each of the sub-projects are expected to be implemented in parallel. As such the consultant is required to provide adequate personnel and equipment required to execute the tasks for the three sub-projects in parallel.

4.2 Estimated time implementation period

- i. The total duration of the Engineering Design Review & Update & detail design of DMA will be Six (06) months.
- ii. The total duration of the Assistance in tendering management will be Six (06) months.

- iii. Total Duration of Construction Supervision will be Twenty-Four (24) months excluding 12 months (12) of defect liability period.
- iv. Total Duration will be Forty-eight (48) months.

4.3 Deliverables

The DR&CSC will be required to prepare and submit the deliverables outlined in Table below.

Table 4: Required deliverables under the consultancy

No.	Deliverables	Estimated Duration
Phase 1 & 2: Design Review, Updating E&S Studies & Tender Documents for assignments as defined in ToR under Sub-Project-A, B & C		
1	Submission of Inception Report The DR&CSC will submit a comprehensive report covering therein all the tasks to be covered under this contract and elaborating therein on the related Methodology, Project Implementation Plan, Quality implementation Plan, Staff Plan with numbers & positions and timelines.	One month after the commencement of services
2	Submission of Draft Design Review Report separately for each sub-project.	Two months after the commencement of services
	Draft Design Review Report for Sub-Project-A	
	Draft Design Review Report for Sub-Project-B	
	Draft Design Review Report for Sub-Project-C	
	Detail Design Report for Sub-Project-C5	Two months after the commencement of services
3	Updated E&S instruments including ESMPs and RAP in case of changes in the design, projects scope or any other changes (Sub project A, B, C1, C2, C3 & C4) for each of the sub-projects. The report should also provide details of activities performed to fulfill any E&S requirements. Updated E&S instruments including ESMPs and RAP in case of changes in the design, projects scope or any other changes.	Two months after the commencement of services
4	E&S instruments including ESMPs and RAP for Sub-Project C5	Two months after the commencement of services
5	Submission of Final Design Review report, Updated E&S reports and cost estimates for each of the sub-projects.	Four months after the commencement of services
6	Submission of Updated Bidding Documents along with Technical Specifications, BOQ's, tender & construction drawings for each of the sub-projects.	Four months after the commencement of services

No.	Deliverables	Estimated Duration
Phase 3: Construction Supervision and contract management for Sub-Project A, B & C		
1	Supervision & Contract Management Manual	One month after commencement of services
2	Monthly Construction Management, site Supervision & construction activities progress report.	Each month
3	Quarterly Training Reports of KW&SC staff.	Every Quarter
4	Monthly Citizen Engagement/Consultations with Communities and E&S Safeguard documents Implementation Report.	Each month
5	Monthly, Quarterly and Bi-annual Progress reports of E&S activities as per ESMPs & ARAP/RAP	Monthly, Every Quarter / Bi Annual
6	Submission of Report on tests of equipment and installations at the end of works including status of substantial and final completion certificates.	As needed or One month after completion
7	As-built drawings (to be prepared by the contractor and reviewed/approved by the DR&CSC)	As needed or One month after completion
8	O&M Manual (to be prepared by the contractor and reviewed/approved by the DR&CSC). This should include a detailed O&M Manual for DMA operation.	As needed or One month after completion
9	Submission of Final Completion Report on Contractors' final account and handover of works including all necessary as-built drawings with soft copies in the form of GIS shape files.	Within 60 Days after Completion of Project
10	Project Closeout Report.	At Handover stage
Phase 4: Defects Liability Period for Sub-Project A, B & C		
1	Defects Rectification and Verification Report A comprehensive report confirming that all defects identified during the DLP have been rectified by the contractor and verified by the DR&CSC through site inspections and testing.	One month before Defects Liability Period expires
2	Final Completion / Taking-Over Certificate Issued or recommended by the DR&CSC to the client, confirming that the works are fully satisfactory, free of defects, and can be formally accepted — enabling release of retention and project closure.	At the expiry of Defects Liability Period

Note: The Design Review & Construction Supervision for Sub-Projects A, B and C will be carried out simultaneously and will be completed in a period of Thirty (30) months excluding defect liability period.

4.3.1 Structure and content of the reports/deliverables

The Table of Contents for all deliverables shall be prepared and shared with the Client for review and agreement prior to report preparation. Only after the Client’s approval of the Table of Contents shall the DR&CSC proceed with developing the report.

Final submission of the report shall be made in accordance with the agreed-upon structure and content.

4.3.2 Submission of deliverables

Four (4) copies & one original in color of every report will be submitted to Project Implementation Unit (PIU) of KWSSIP’s initial review and comments along with editable soft copies (AutoCAD, MS Office, Shapefiles etc.) and native version of hydraulic model files wherever applicable will be submitted after incorporating Project Implementation Unit (PIU) of KWSSIP’s final comments as Approved Final Report.

- The DR&CSC shall prepare and submit the reports which shall be accompanied by an executive summary.
- The reporting shall be in English language.

5 CONSULTANT QUALIFICATION

5.1 Qualifications and experience of key staff

The Consultancy firm must be specialized and have capacity to carry out Design Review and Construction Supervision of the proposed work. Please note that the services required for each of the sub-projects are expected to be implemented in parallel. As such the consultant is required to provide adequate personnel and equipment required to execute the tasks for the three sub-projects in parallel.

The stated staff for design review as well as supervision consultant is indicative and completion of design review in 06 months and construction supervision for 24 months is fixed. Therefore, if required, DR&CSC can propose additional resources for timely completion. The consultant should include the financial costs (fees and reimbursable) for the non-key staff. Thus, it is assumed that the financial proposal will be inclusive of all staff and associated costs.

Table 5: Staff requirement for the project

S#	Position	Qualification	No. of Staff	Input-Months	% of min time input in-country ²
PHASE 1&2: DESIGN REVIEW, UPDATE OF E&S & ASSISTANCE IN TENDERING PHASE					
KEY EXPERTS					

² In-country means in Karachi (Pakistan)

S#	Position	Qualification	No. of Staff	Input-Months	% of min time input in-country ²
1	Team Leader / Senior Design Engineer (Water & Sewerage)	Bachelor's Degree in Civil Engineering or equivalent, plus Master's Degree in Civil Engineering. Minimum 15 years of overall professional experience and/or having worked on 02 contracts of comparable scope in the similar position/role in project planning and management, designing of water & sewerage system with preferably 05 years' experience as Team Leader on above stated projects. Preferable: Working experience at International Financing Institutions (IFIs).	1.00	12.00	50%
2	Design Engineer (Water)	Bachelor's Degree in Civil Engineering or equivalent, plus Master's Degree in Civil Engineering Minimum 10 years of overall professional experience and/or having worked on 02 contracts of comparable scope in the similar position/role in designing of water infrastructure works including hands-on experience in hydraulic modelling using simulations model such as WaterGems, WaterHammer, EPA Net, etc.	1.00	6.00	75%
3	Design Engineer (Sewerage)	Bachelor's Degree in Civil Engineering or equivalent, plus Master's Degree in Civil Engineering. Minimum 10 years of overall professional experience and/or having worked on 02 contracts of comparable scope in the similar position/role in designing of water infrastructure Sewerage including hands-on experience in hydraulic modelling using simulations model such as SewerGems, etc.	1.00	6.00	75%
4	Contract and Procurement Specialist	Bachelor's Degree or above in Civil/Elect/Mech Engineering or relevant discipline. Minimum 10 years of professional experience in Contract Management of large infrastructure projects.	1.00	6.00	30%
5	Environmental Health & Safety Specialist	Minimum Bachelors' degree in Environmental Sciences / Environmental Engineering or a similar discipline and NEBOSH / similar safety certifications. Preferably 10 years of professional experience and/or having worked on 02 contracts of comparable scope in the similar position/role. Preferable: Working experience at International Financing Institutions (IFIs).	1.00	3.00	75%
6	NRW Management Specialist	Bachelor's Degree or above in Civil Engineering or relevant discipline. Minimum 15 years of professional experience and/or having worked on 03 contracts of comparable scope in the similar position/role of working at water supply Projects pertaining to NRW, hydraulic modelling,	1.00	6.00	75%

S#	Position	Qualification	No. of Staff	Input-Months	% of min time input in-country ²
		establishing of DMA's / DMZ's, sectorization and water metering systems. Working experience in World Bank/Foreign Funded Projects will be an added advantage.			
Phase 1& 2: NON-KEY EXPERTS (suggested) Design Phase					
1	Assistant Design Engineer (Water)	Bachelor's Degree or above in Civil Engineering or relevant discipline. Minimum 05 years of professional experience in project designing, planning and project management pertaining to Water supply works.	3.00	6.00	50%
2	Assistant Design Engineer (Sewerage)	Bachelor's Degree or above in Civil Engineering or relevant discipline. Minimum 05 years of professional experience in project designing, planning and project management pertaining to Sewerage works.	2.00	6.00	50%
3	Assistant Design Engineer (Electrical/Mechanical)	Bachelor's Degree or above in Electrical/Mechanical Engineering or relevant discipline. Minimum 05 years of professional experience of working at large infrastructure projects pertaining to water supply pipelines and metering system.	1.00	2.00	30%
4	Design Engineer (Electrical & Mechanical)	Bachelor's Degree in Electrical/Mechanical Engineering or equivalent, plus Minimum Master's Degree in Electrical/Mechanical Engineering. Preferably 10 years of overall professional experience and/or having worked on 02 contracts of comparable scope in the similar position/role in designing of E&M works of water & sewerage projects.	1.00	2.00	50%
5	Social Development Specialist	Minimum post-graduate degree in a relevant social science (development studies, sociology, gender studies, anthropology, social policy, etc.). Preferably 10 years of experience of working and/or having worked on 02 contracts of comparable scope in the similar position/role on social development, community engagement, and social assessments.	1.00	3.00	75%
6	Quantity Surveyor	Bachelor's Degree or above in Civil Engineering or relevant discipline. Minimum 10 years of overall professional experience in surveying especially at large water supply and sewerage projects.	2.00	3.00	30%

S#	Position	Qualification	No. of Staff	Input-Months	% of min time input in-country ²
7	Structure Consultant	Bachelor's Degree in Civil and Master's in Structural Engineering or relevant discipline. Minimum 10 years of professional experience of working at large infrastructure projects pertaining to Water & Sewerage related.	1.00	4.00	30%
8	Surveyor	Bachelor's Degree or above in Civil Engineering DAE Civil or relevant discipline. Minimum 10 years of overall professional experience in surveying especially at large water supply and sewerage projects.	1.00	4.00	75%
9	Resettlement & Livelihood Specialist	Minimum Bachelor's degree in a relevant social science (resettlement studies, development studies, sociology, anthropology, urban studies etc.). Preferably 10 years of experience of working and/or having worked on 02 contracts of comparable scope in the similar position/role on involuntary resettlement and preparation of RAPs. Preferable: Working experience at World Bank/Foreign Funded Projects	1.00	3.00	50%
10	Environmental Specialist	Minimum Bachelor's degree in Environmental Sciences / Environmental Engineering or a similar discipline. Preferably 10 years of Professional experience and/or having worked on 2 contracts of comparable scope in the similar position/role. Preferable: Working experience at World Bank/Foreign Funded Projects	1.00	3.00	50%
11	Gender Specialist	Minimum Bachelor's degree in a relevant social science (gender studies, development studies, sociology, social policy, etc.). Preferably 10 years of experience of working and/or having worked on 02 contracts of comparable scope in the similar position/role on gender mainstreaming, gender analysis, and implementation of gender action plans. Preferable: Working experience at World Bank/Foreign Funded Projects.	1.00	2.00	50%
PHASE 3&4: CONSTRUCTION SUPERVISION & DEFECTS LIABILITY PERIOD					
KEY EXPERTS					
1	Project Manager / (Team Leader)	Bachelor's Degree in Civil Engineering or equivalent plus Master's Degree in Civil Engineering or relevant discipline. Preferably masters in Project Management having 15 years of overall professional experience and having worked on at least 02 contract of comparable scope in the similar position/role. Must have experience in Project / Construction for at least 05 years as a project manager	1.00	36.00	50%

S#	Position	Qualification	No. of Staff	Input-Months	% of min time input in-country ²
2	Dy. Project Manager / Chief Resident Engineer	Bachelor's Degree in Civil Engineering or equivalent plus Preferably 15 years of overall professional experience and having worked on at least 02 contract of comparable scope in the similar position/role. Must have experience in Project / Construction for at least 05 years as a project manager	1.00	30.00	75%
3	Resident Engineer (Civil)	Bachelor's Degree in Civil Engineering or relevant discipline. Minimum 15 years of overall professional experience in project execution, construction supervision and project management of large water supply and sewerage projects having worked on 02 contracts of comparable scope in the similar position/role. Working experience in World Bank/Foreign Funded Projects will be an added advantage.	4.00	30.00	100%
4	Social Development Specialists	Minimum post-graduate degree in a relevant social science (development studies, sociology, gender studies, anthropology, social policy, etc.). Preferably 10 years of experience of working and/or having worked on 02 contracts of comparable scope in the similar position/role on social development, community engagement, and social assessments. Preferable: Working experience at World Bank/Foreign Funded Projects. Experience of working during the implementation phase required	3.00	24.00	100%
5	Health, Safety & Environmental Specialist	Minimum Bachelor's degree in Environmental Sciences / Environmental Engineering or a similar discipline and IOSH / NEBOSH safety certifications. At least 07 years of professional experience in a similar position. Preferable: Working experience at World Bank/Foreign Funded Projects. Experience of working during the implementation phase required	1.00	24.00	100%
6	DMA Establishment Expert	Bachelor's Degree or above in Civil Engineering or relevant discipline. Minimum 10 years of professional experience and/or having worked on 02 contracts of comparable scope in the similar position/role of working at water supply Projects pertaining to NRW, establishing of DMA's / DMZ's and water metering systems. Working experience in World Bank/Foreign Funded Projects will be an added advantage.	1	12.00	100%
NON-KEY EXPERTS (suggested)					

S#	Position	Qualification	No. of Staff	Input-Months	% of min time input in-country ²
1	Assistant Resident Engineer (Civil)	Bachelor's Degree in Civil Engineering or relevant discipline. Minimum 15 years of overall professional experience in project execution, construction supervision and project management of large water supply and sewerage projects.	8.00	24.00	100%
2	Assistant Resident Engineer (Civil)	Bachelor's Degree in Civil Engineering or relevant discipline. Minimum 15 years of overall professional experience in project execution, construction supervision and project management of large water supply and sewerage projects.	3.00	36.00	100%
3	Assistant Resident Engineer (Mechanical/Electrical)	Bachelor's Degree in Mechanical/Electrical Engineering or relevant discipline. Minimum 15 years of overall professional experience in project execution, construction supervision and project management of large water supply and sewerage projects.	3.00	30.00	100%
4	Resident Engineer (Elect. / Mech.)	Bachelor's Degree in Electrical /Mechanical Engineering or relevant discipline. Minimum 15 years of professional experience of working at large infrastructure projects pertaining to water supply pipelines, Installations and metering system having worked on 02 contracts of comparable scope in the similar position/role.	2.00	30.00	100%
5	Contract Specialist	Minimum Bachelor's Degree in Civil/Elect/Mech Engineering or relevant discipline (Master's degree will be preferred). Preferably 15 years of overall professional experience and having worked on 02 contracts of comparable large infrastructure works in the similar position/role.	1.00	32.00	40%
6	Material Engineer	Bachelor's Degree in Material/Civil/Mechanical Engineering plus Master's Degree in Civil/Mechanical Engineering or relevant discipline. Preferably 15 years of overall professional experience and having worked on 02 contracts of comparable scope in the similar position/role.	1.00	18.00	50%
7	Chief/Land Surveyor / Geomatics Engineer	Minimum Bachelor's Degree in Civil Engineering / DAE Civil or relevant discipline. Preferably 15 years of overall professional experience and/or having worked on 02 contracts of comparable scope in the similar position/role. Experience of GIS and remote Sensing	1.00	26.00	75%

S#	Position	Qualification	No. of Staff	Input-Months	% of min time input in-country ²
8	Quality Assurance / Control Engineer	Bachelor's Degree in Civil Engineering and Master's Degree in relevant discipline. Minimum 15 years of overall professional experience in Construction, Quality Control of Civil works at large water supply and sewerage projects. Experience in quality management system is an added advantage	1.00	24.00	50%
9	Geotechnical Engineer	Bachelor's Degree in Geotechnical/Civil Engineering plus Master's Degree in relevant discipline. Preferably 15 years of overall professional experience and having worked on 02 contracts of comparable scope in the similar position/role.	1.00	12.00	30%
10	Assistant Material Engineer (Civil)	Bachelor's Degree or above in Material/Civil Engineering or relevant discipline. Minimum 5 years of overall professional experience in execution of large-scale civil infrastructure projects as Material Consultant.	1.00	24.00	100%
11	Assistant Material Engineer (Mechanical)	Bachelor's Degree or above in Material/Mechanical Engineering or relevant discipline. Minimum 5 years of overall professional experience in execution of large-scale civil infrastructure projects as Material Consultant.	1.00	24.00	100%
12	Assistant Land Surveyor / Geomatics Engineer	Minimum Bachelor's Degree in Civil Engineering / DAE Civil or relevant discipline. Preferably 5 years of overall professional experience and having worked on 01 contracts of comparable scope in the similar position/role. Experience of GIS and remote Sensing	3.00	24.00	75%
13	Quantity Surveyor	Bachelor's Degree or above in Civil Engineering or relevant discipline. Minimum 10 years of overall professional experience as Quantity Surveyor especially at comparable scope projects.	1.00	28.00	30%
14	Resettlement / Livelihood Specialists	Minimum post-graduate degree in a relevant social science (resettlement studies, development studies, sociology, anthropology, urban studies etc.). Preferably 10 years of experience of working and having worked on 02 contracts of comparable scope in the similar position/role on involuntary resettlement and preparation of RAPs. Preferable: Working experience at World Bank/International Financing Institutions. Experience of working during the implementation phase required	2.00	24.00	30%
15	Gender Specialist	Minimum post-graduate degree in a relevant social science (gender studies, development studies, sociology, social policy, etc.). Preferably 10 years of experience of working and/or having worked on 02	1.00	24.00	50%

S#	Position	Qualification	No. of Staff	Input-Months	% of min time input in-country ²
		contracts of comparable scope in the similar position/role on gender mainstreaming, gender analysis, and implementation of gender action plans. Preferable: Working experience at World Bank/International Financing Institutions. Experience of working during the implementation phase required			
16	Environment Specialists	Minimum Master's degree in Environmental Sciences / Environmental Engineering or a similar discipline. Preferably 10 years of Professional experience and/or having worked on 2 contracts of comparable scope in the similar position/role. Preferable: Working experience at World Bank/International Financing Institutions. Experience of working during the implementation phase required	3.00	24.00	75%
17	Environmental Officers (Field Level)	Minimum Bachelor's degree in Environmental Sciences / Environmental Engineering or a related discipline, with IOSH / NEBOSH safety certifications. Preferably 05 years of experience of working in a similar position/role on environmental compliance, monitoring, and reporting. Preferable: Working experience at World Bank/International Financing Institutions. Experience of working during the implementation phase required	4.00	24	100%
18	Social Officers (Field Level)	Minimum Bachelor's degree in a Social sciences or relevant fields. At least 05 years of experience working on managing social, community, labor and gender issues at work sites. Preferable: Working experience at World Bank/International Financing Institutions. Experience of working during the implementation phase required	6.00	24	100%

Notes

- i. Key experts shall be registered with relevant and recognized professional bodies in their respective disciplines.
- ii. Evaluation will consider only key staff. However, the consultant should ensure that the non-key staff meet the minimum requirements specified.

6 Reporting Requirements/arrangements

The Consultant will report to the Contract Manager, KWSSIP on day-to-day basis on general operational matters and to the Project Director on the contractual issues.

7 Obligations of the Parties

7.1 Obligations of the client

- The Client shall assist the Consultant with obtaining work permits and such other documents as shall be necessary to enable the Consultant to perform the Services.
- The Client shall assist the Consultant with promptly obtaining, for the Experts and, if appropriate, their eligible dependents, all necessary entry and exit visas, residence permits, exchange permits and any other documents required for their stay in the Client's country while carrying out the Services under the Contract.
- The Client shall facilitate prompt clearance through customs of any property required for the Services and of the personal effects of the Experts and their eligible dependents.
- The Client shall assist the Consultant for the Services with obtaining exemption from any requirement to register or obtain any permit to practice its profession according to the applicable law in the Client's country.
- The Client shall cause the Consultant to have, free of charge, unimpeded access to the project site in respect of which access is required for the performance of the Services.
- The Client shall make available to the Consultant and the Experts, for the purposes of the Services, facilities and property described in the Terms of Reference.
- The Client shall make available to the Consultant free of charge such professional and support counterpart personnel, to be nominated by the Client with the Consultant's advice, if specified in the Contract.
- In consideration of the Services performed by the Consultant under this Contract, the Client shall make such payments to the Consultant in such manner as provided in the Contract.

7.2 Obligations of the consultant

Site Management, Facilities, and Logistics

The Consultant shall be responsible for managing the complete engineering and supervision setup at the project site. This includes establishing and maintaining fully functional site offices equipped with all necessary furniture, utilities, and communication, computing and printing facilities and stationery where such facilities or services are outsourced, the consultant shall meet all the costs. The Consultant shall also arrange for transportation, logistics, and all ancillary equipment required for effective execution of the services. The consultant shall be responsible for the welfare of his staff including living expenses and health and other insurances. The consultant shall be responsible for payment of any applicable taxes and duties. The consultant shall also be responsible for application and costs of VISAs, work permits, licenses etc. All costs associated with the establishment, operation, and maintenance of such facilities and resources shall be borne by the Consultant.

8 Payment terms and conditions

8.1 Phase 1 and 2 Design Review and Assistance in tender management

The Payment for Design Services (shall be made on lump sum basis against the Deliverables specified above and broken down as below.

Table 6 Payment terms for Phase 1 & 2: Design Review and Tender Documentation

No.	Deliverables	Payment (% of total sum less provisional sums if any)
1	Inception Report	15%
2	Submission of Draft Design Review Report separately for each sub-project.	15%
	Draft Design Review Report for Sub-Project-A	
	Draft Design Review Report for Sub-Project-B	
	Draft Design Review Report for Sub-Project-C	
	Draft Detail Design Report for Sub-Project-C5	
3	Updated E&S instruments including ESMPs and RAP in case of changes in the design, projects scope or any other changes (Sub project A, B, C1, C2, C3 & C4) for each of the sub-projects. The report should also provide details of activities performed to fulfill any E&S requirements. Updated E&S instruments including ESMPs and RAP in case of changes in the design, projects scope or any other changes.	20%
	E&S instruments including ESMPs and RAP for Sub-Project C5	
4	Submission of Final Design Review report, Updated E&S reports and cost estimates for each of the sub-projects (A,B,C1,C2,C3 & C4). Submission of Detail Design report, E&S reports and cost estimates for Sub Project C5.	20%
5	Submission of Updated Bidding Documents along with Technical Specifications, BOQ's, tender & construction drawings for each of the sub-projects.	30%

8.2 Phase 3 and 4: Construction supervision and defects liability period

Payments for these phases will be time based and where applicable dependent on submission and approval of any due deliverables.

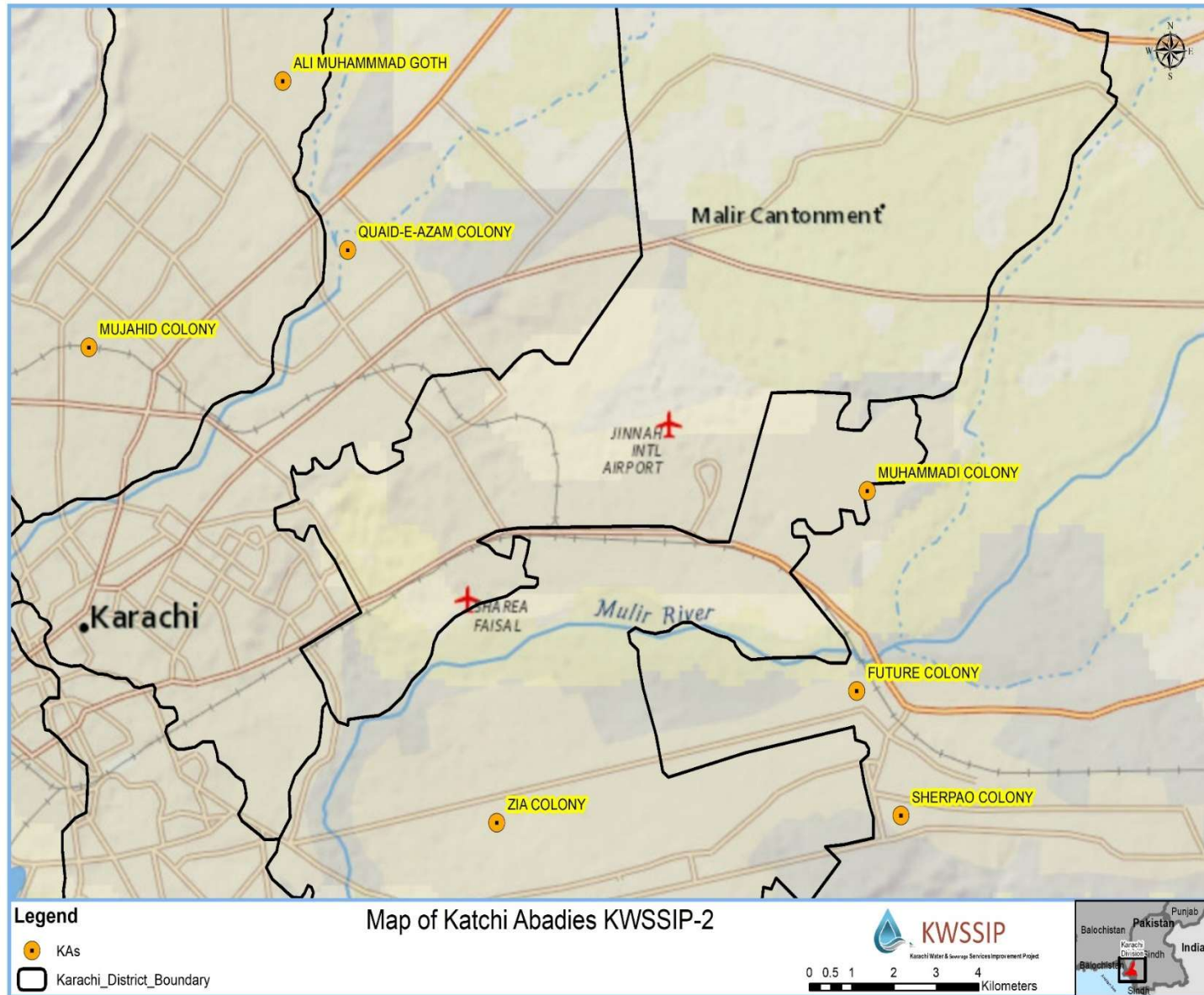
9 ANNEXES

9.1 ANNEX A: Available information and documentation

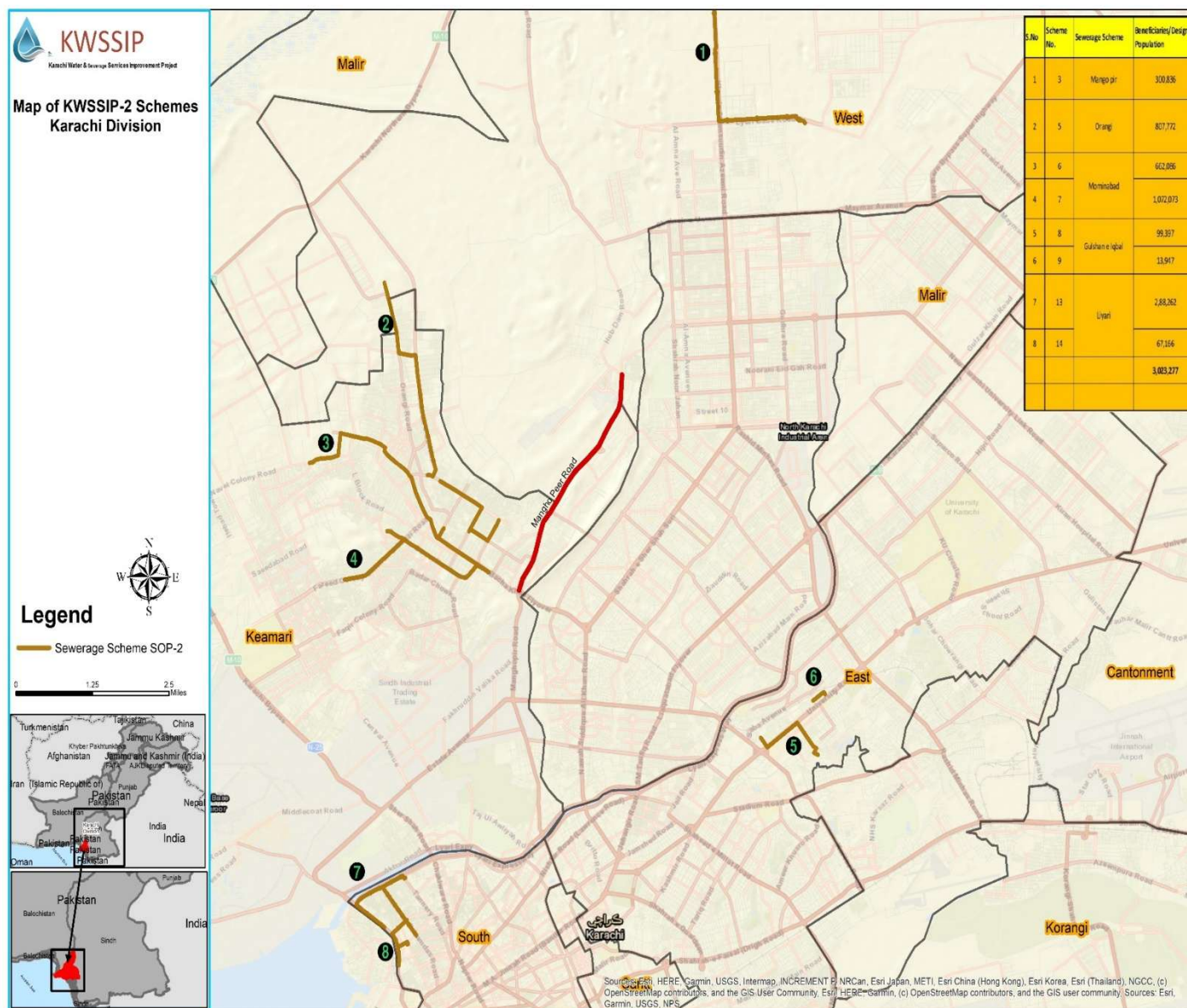
Documents to be shared at RFP stage from previous design consultants are listed below. A platform or link will be created later for consultant to access these documents.

- Detail design reports
- Cost estimates
- E&S instruments
- Tender documents
- Topographical survey
- Geo-technical survey
- Hydraulic models

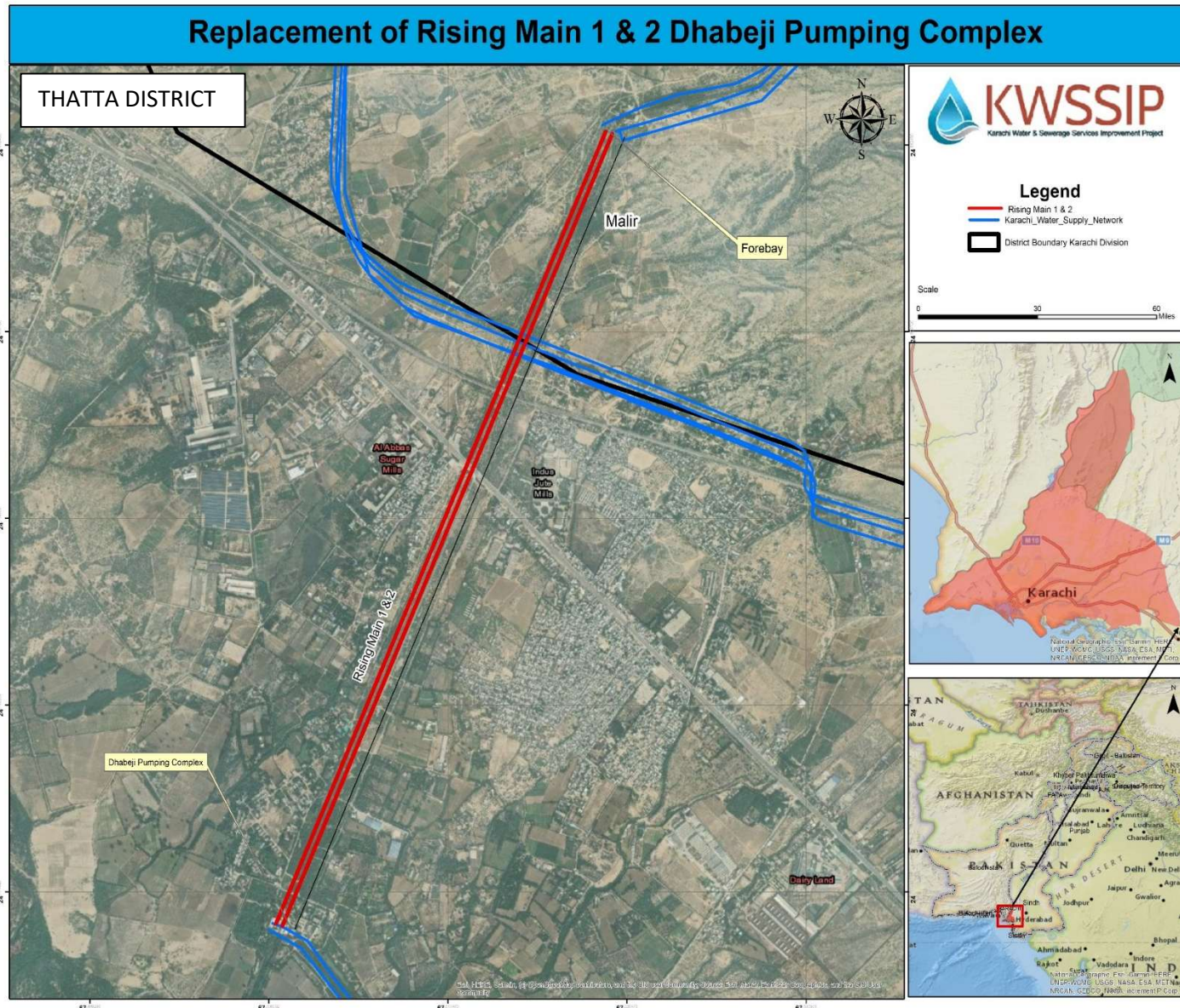
9.2 ANNEXURE-B : KATCHI ABADI MAP (SUB-PROJECT-A)



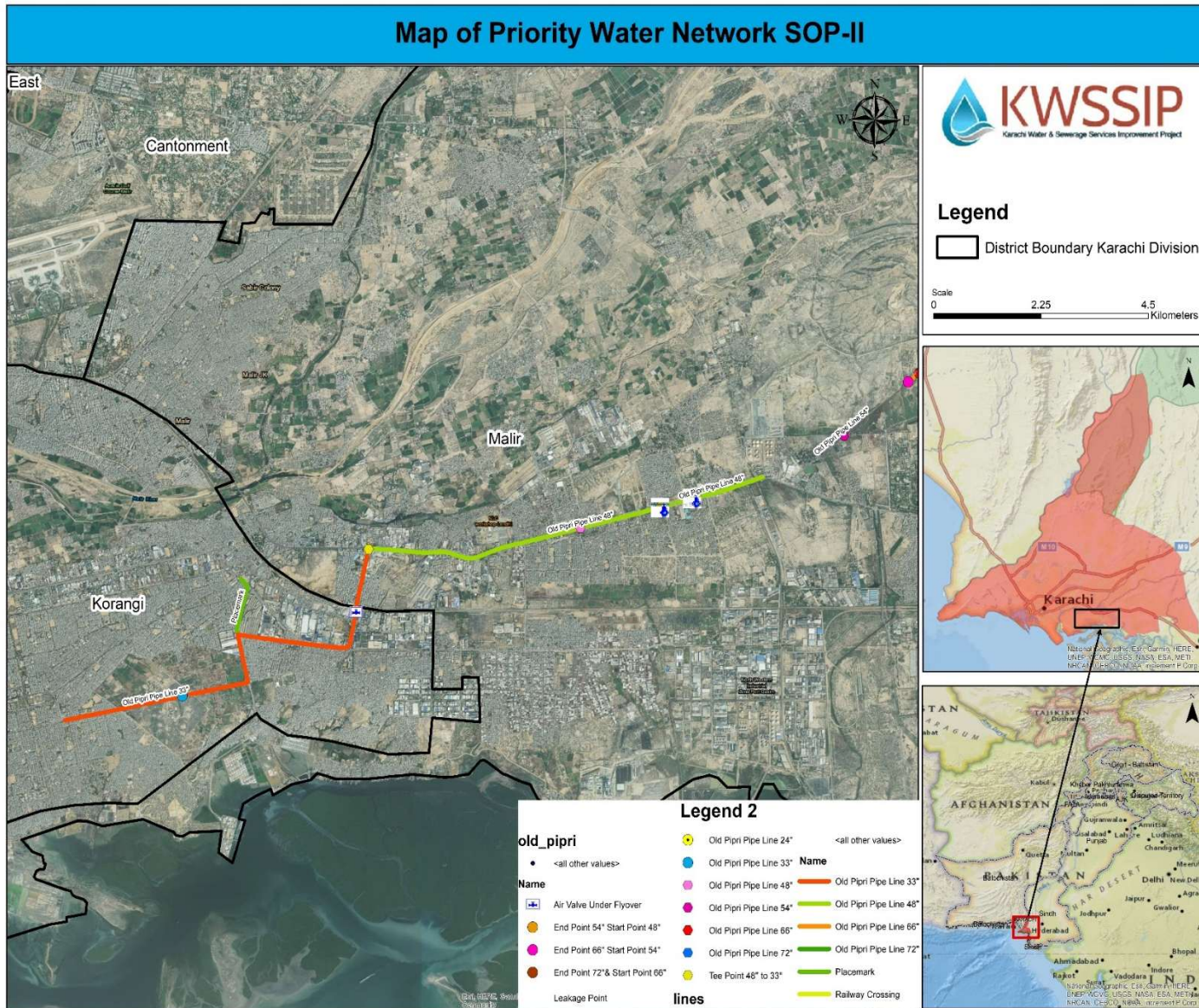
9.3 ANNEXURE-C : SEWER REHABILITATION MAP (SUB-PROJECT-B)



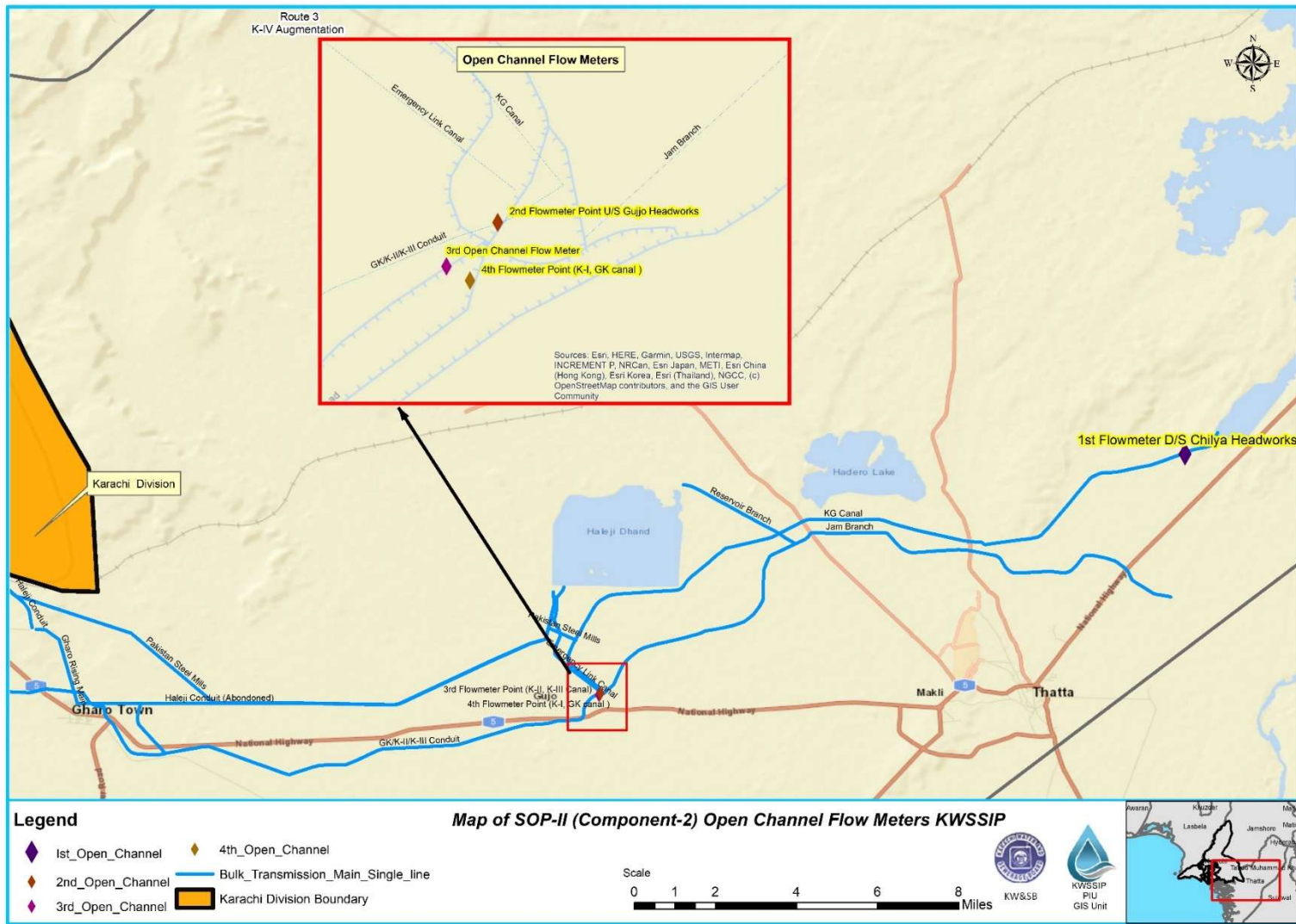
9.4 ANNEXURE-D : DHABEJI RISING MAIN 1&2 MAP (SUB PROJECT – C)



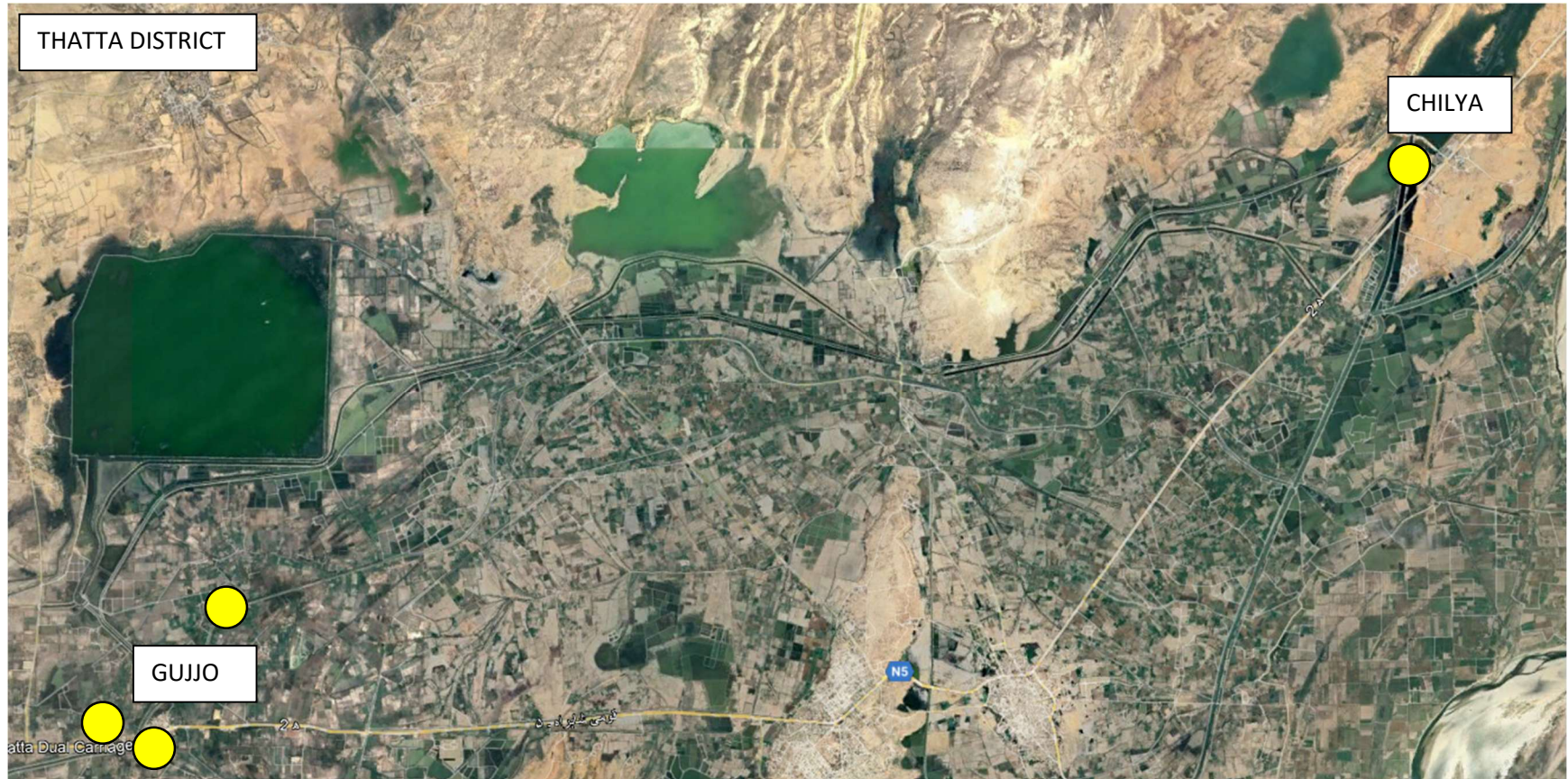
9.5 ANNEXURE-E : SEALING OF JOINTS MAP (SUB PROJECT – C)



9.6 ANNEXURE-F : OPEN CHANNEL FLOW METERS MAP (SUB PROJECT – C)



9.7 ANNEXURE-G : OPEN CHANNEL FLOW METERS MAP (SUB PROJECT – C)



9.8 ANNEXURE-H : CONSUMER FLOW METERS MAP (SUB PROJECT – C)

