

# POST-FLOOD 2022 RECONSTRUCTION PROGRAM: RESILIENCE ENHANCEMENT AND LIVELIHOOD DIVERSIFICATION IN BALOCHISTAN

## TERMS OF REFERENCE for CONSULTANCY SERVICES

### CONSULTANCY SERVICES FOR PREPARATION OF ASSESSMENT STUDY, PREPARATION OF DETAILED DESIGNS, PROCUREMENT ASSISTANCE AND SUPERVISION OF WORKS (IRRIGATION INFRASTRUCTURE).

#### i. **Background:**

Over the past two decades, Pakistan significantly reduced poverty, but human development outcomes have lagged, and severe economic challenges put past gains at risk. Pakistan made significant progress towards reducing poverty between 2001 and 2018 when the expansion of off-farm economic opportunities and increased inflow of remittances allowed over 47 million Pakistanis to rise out of poverty. However, this rapid poverty reduction has not fully translated into improved socio-economic conditions, as human capital outcomes have remained poor and stagnant, with high levels of stunting at 38 percent and learning poverty at 75 percent. The deterioration of economic conditions, in combination with non-economic shocks such as the COVID 19 pandemic and the devastating floods of 2022, are expected to reduce household incomes and increase their vulnerability to fall below the national poverty line.

The recent floods have had enormous human and economic impacts. Pakistan experienced heavy monsoon rains between June and September 2022, severely affecting millions of households, mainly in Sindh and Balochistan. Roughly 33 million people have been displaced, and more than 13,000 km of roads destroyed. The flooding has damaged 2.2 million houses, flooded around 9.4 million acres of crops, and killed an estimated 1.2 million livestock, adversely affecting rural livelihoods. Limited access to input and output markets and temporary disruptions to supply chains have driven up food prices and added to existing price pressures resulting from reduced agricultural yields and the global rise of food prices. Due to significant crop and livestock losses, food shortages have intensified in the fall and winter, with food price inflation increasing to more than 50 percent. With the destruction of infrastructure and disrupted access to schools, medical facilities, and sanitation systems, the floods have negatively impacted health and education outcomes especially for rural areas, potentially affecting long-term human capital accumulation. Preliminary estimates suggest that the national poverty rate may increase by up to 4 percentage points as a direct consequence of the floods, potentially pushing around 9 million people into poverty. The recently completed Post-Disaster Needs Assessment (PDNA)<sup>1</sup> estimated that the need for rehabilitation and reconstruction is at US\$16.3 billion, not including much-needed new investments to strengthen Pakistan's resilience to future shocks.

At a national level, the PDNA shows that housing, agriculture, water supply and sanitation, and irrigation sectors bear the brunt of the damage. The provinces of Sindh and Balochistan account for approximately 50 percent and 15 percent of recovery and reconstruction needs, respectively. Table 1 shows the damage, loss, and needs<sup>2</sup> breakdown by region.

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<sup>1</sup> Government of Pakistan. 2022. *Pakistan Floods 2022 Post-Disaster Needs Assessment*. Ministry of Planning Development & Special Initiatives.

<sup>2</sup> **Damage** is defined as direct costs of destroyed or damaged physical assets. It is valued in monetary terms with costs estimated based on replacing or repairing physical assets and infrastructure, considering the replacement price prevailing before the crisis. **Loss** is defined as changes in economic flows resulting from the disaster and valued in monetary terms. Together, damage and loss constitute the effects of the crisis. Needs costing draws on the monetary value of damage and loss but is not equal to the sum of those estimates. Recovery and reconstruction needs are calculated in terms of replacement costs according to current prices and include a premium linked to building-back-better principles, and needs associated with the recovery of the sector. The reconstruction and recovery needs include short (up to 12 months) and intermediate to long-term (up to five years) activities.

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**Table 1. Total Damage, Loss, and Needs in Pakistan<sup>3</sup>**

Region	Damage		Loss		Needs	
	PKR billion	US\$ million	PKR billion	US\$ million	PKR billion	US\$ million
Balochistan	349	1,625	541	2,516	491	2,286
Khyber Pakhtunkhwa	201	935	141	658	168	780
Punjab	111	515	122	566	160	746
Sindh	1,948	9,068	2,444	11,376	1,688	7,860
Cross-Provincial*	587	2,731	14	67	975	4,540
Special Regions**	7	32	11	49	10	48
<b>Grand Total</b>	<b>3,202</b>	<b>14,906</b>	<b>3,272</b>	<b>15,233</b>	<b>3,493</b>	<b>16,261</b>

Source: Government of Pakistan 2022.

\* Cross-provincial includes assets that affect more than one province or are calculated at the national level (e.g. railways, roads, telecommunications, etc.). The classification is in line with the public budget.

\*\* Special regions include districts outside of the four main provinces that have been affected by the floods and declared “calamity-hit.”

Extreme weather events have increased in frequency and intensity, impacting ecosystems, people, settlements, and infrastructure. Heatwaves, heavy precipitation events, droughts, and cyclones are prevalent risks. Attribution research on the 2022 floods has shown that the 5-day maximum average rainfall of Balochistan and neighboring Sindh was around 75 percent more intense than it would have had the climate not warmed by 1.2 degrees.<sup>4</sup> Climate projections have been predicting such a shifting trend for years. Historical records show that heavy rainfall has significantly increased in the region alongside the increase in greenhouse gas emissions, strongly suggesting climate change played a central role in the event. The floods came on the heels of a severe heatwave and saw temperatures continuously above 45°C, resulting in crop losses, power outages, and forest fires. These changes in climate and extreme events are likely to disproportionately affect the most disadvantaged groups, among these low-income businesses, those engaged in manual labor jobs, poorer farmers, women, and children.

In addition, Pakistan’s climate vulnerability and uncertainty surrounding annual glacial melt, average precipitation, and extreme temperature changes highlight the need for ex-ante disaster preparedness and resilience building.

The Ministry of Planning, Development and Special Initiatives (MoPDSI) has developed the Resilient Recovery, Rehabilitation and Reconstruction Framework (4RF) to guide the government’s response to the 2022 floods based on the needs identified across the 17 sectors covered in the PDNA. The 4RF defines measures to ensure a resilient recovery and prevent multi-generational impacts that may manifest through reduced developmental gains. Through the 4RF, Government of Pakistan (GoP) recognizes the importance of long-term resilience in the aftermath of the unprecedented flooding and is committed to consolidating ongoing efforts and undertaking new measures toward improved resilience. The proposed operation responds to immediate emergency recovery needs in Balochistan province while contributing to building flood resilience.

The Government of Pakistan has obtained loan from the World Bank and provided as grant in aid to the Government of Balochistan for implementation of the Resilience, Enhancement, and Livelihood Diversification in Balochistan (IFRAP). The IFRAP Project is being implemented by the Government of Balochistan with support from other government departments and various consultants.

<sup>3</sup> Government of Pakistan (2022). Pakistan Floods 2022 Post-Disaster Needs Assessment.

<sup>4</sup> World Weather Attribution, 2022. <https://www.worldweatherattribution.org/wp-content/uploads/Pakistan-floods-scientific-report.pdf>

The Client (Government of Balochistan, Irrigation Department through Project Director BIWRMDP-CLIENT IFRAP) intends to conduct detailed assessment for reconstruction/rehabilitation of the damaged Irrigation infrastructure caused by floods in 2022 (as reported in PDNA) in the reported districts of Balochistan through a consultancy agreement against the allocated share of Rs. 30 M USD equivalent to Rs. 8400 M under the project titled "Resilience, Enhancement, and Livelihood Diversification in Baluchistan through ranking on the basis of cost effectiveness. The study assigned is for assessing flash flood damaged irrigation infrastructure, including dams, Flood Protection Schemes, Perennial and Flood Irrigation Schemes and to evaluate the extent and severity of the damages, identify the underlying causes, and develop a plan for restoration and rehabilitation of the infrastructure with estimated cost, Restoration Plan, Risk Assessment reports, IEE/EIA, ESMP, bid preparation & bidding documents under World Bank Procurement Regulations. The Irrigation Department (Government of Balochistan), be the Implementation Agency of the Project and Project Implementation Unit (PIU)-IFRAP has already been established for BIWRMDP headed by a Project Director (Client's Representative).

The Consultant Assignment is divided into two phases lasting a total of 48 months with the first phase take about 6 months and the second that would last up to 42 months based on the project's timeframe and circumstance.

The detailed activities for **Phase-1 (Detail Engineering Design)** will be based on:

1. Comprehensive assessment level study (Hydrological Analyses, Geotechnical Survey where required, Structural Inspection, Topographic Mapping, Environmental Impact Assessment) for irrigation schemes attached as Annexure-1
2. To carry out detail feasibility level study of irrigation schemes given in Annexure-1 with necessary technical engineering studies level and tender documents for implementation with detailed design and construction planning/supervision arrangement modality on the improved irrigation efficiency for optimal operation and utilization of water management in the given schemes command areas and Preparation of site-specific ESMPs where required that are fully compliant with the World Bank's safeguards requirements. In addition, Quality assurance report along with monthly progress reports will also be submitted to the Client (Hydraulic Modelling, Water Demand Analysis, Socio-Economic Assessment, Bidding Document Preparation, Environmental and Social Management Plans (ESMPs), Quality Assurance and Progress Reporting).
3. Submission of Bidding Documents against schemes/packages Simultaneously as per the resilient design (Resilient Design Integration, Bid Packaging Strategy, Timely Bid Submission, Bid Evaluation Support, Contract Negotiation Assistance)

The detailed activities for **Phase-2 (Supervision) for irrigation** will be based on;

1. Construction supervision and contract administration, including post-construction activities.
  2. Prior to the implementation of civil works contracts, existing engineering designs must be reviewed and updated in accordance with the specified parameters / standards and best international practices.
  3. Ensuring that high-quality construction is completed on time and within budget, and that all works are completed in full compliance with the approved engineering designs, technical specifications, agreed-upon work schedule, and all other contract documents and sound engineering principles.
  4. Ensure project safeguards management and the incorporation of environmental and social management plans into work contracts, as well as the preparation and implementation of site-specific ESMPs that are fully compliant with the Bank's safeguards requirements.
  5. Monitor and evaluate the contractor's and Employer's implementation of environmental and social management plans, resettlement plans, and other social safeguard measures.
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It is pertinent to mentioned that the detailed technical engineering report will include all necessary aspects covering technical, institutional and economics, social/environmental assessments, procurement and financial management etc. required for approval by the Client

## ii. **Objective**

The primary objective of the consulting services is to provide technical services in the form of detailed engineering services to rehabilitate flood-affected irrigation schemes (damaged by 2022 floods) through improved engineering design, as well as to provide the overall supervision and technical support during the construction phase to ensure the satisfactory completion of the flood-affected schemes listed in Annexure-1. This includes 55 schemes in total. The consultant's role is to ensure solid support in the design study and oversee the implementation phase to enhance the overall irrigation efficiency of the schemes.

To achieve this goal, the consultant may need to conduct a detailed survey of the sites, assess the damage caused by the floods, and develop a comprehensive plan for rehabilitation and improvement that considers environmental and safety standards. The consultant should also collaborate with relevant stakeholders to ensure that the design and implementation phases align with project goals, budgets, and timelines. Ultimately, the consulting services should result in a sustainable and efficient irrigation system that improves crop yields and benefits local communities.

The scope of work is not limited to the assigned objectives and can be expanded or reduced as needed.

## **Commencement**

The Consultant shall commence the Services immediately after signing of the Contract Agreement or such other time as the Parties may agree in writing.

## **Time Period**

The Services specified in the TOR shall be completed and all relevant reports submitted to the Client in the form and format acceptable to the Client, within agreed period from the Date of Commencement.

## iii. **Scope of Services**

The scope of services, grouped in two phases, consist of the following major tasks:

### **3.1 Phase-1: Assessment Study for Improved Detailed Engineering Design**

**The following are the main responsibilities of the consultants in improved engineering design for Irrigation component:**

- i. Comprehensive assessment level of study for irrigation infrastructure in Annexure 1 (55 Schemes)
  - ii. Detail feasibility level study with necessary feasibility level design and bidding documents for implementation with detailed design and construction planning/supervision arrangement modality on the improved irrigation efficiency for optimal operation and utilization of water management in the given schemes command areas.
  - iii. Analysis of the existing design and suggest Improvements. The consultant should study the area of investment in order to avoid dispute land tenure
  - iv. Development of a detailed supervision and implementation work plan for the construction phase of irrigation schemes.
  - v. Evaluate safety risks associated with the damaged irrigation infrastructure, including risks to floods (property damage, displacement of people, and loss of life etc), water pollution (water with chemicals, fertilizers, and other harmful substances), soil erosion (soil fertility, affect crop yields) to downstream communities, wildlife habitats, and the environment.
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- vi. Development of a restoration plan on the assessment of the damages and underlying causes for the rehabilitation of the damaged irrigation infrastructure. This will include extent of estimates for repairing the damaged structures and allied components and requirement of maintenance of the infrastructure to reduce the risk of damage from the flash floods in future.
- vii. Development of a socio economic profile and number of effected people where require.
- viii. Preparation of detailed BoQs and Bidding documents for damaged infrastructure.

The mentioned tasks will cover the following actions, which are necessary prerequisites for the reports.

**Site Assessment:** Conduct a comprehensive assessment of the site that has been affected by flash floods. This involves examining the current state of the irrigation component and understanding the extent of the damage subjected to cost benefit ratio and life of the structure.

**Risk Analysis:** Evaluate the potential risks and vulnerabilities associated with the irrigation system in the context of flash floods. Identify areas where the system is most susceptible to damage and suggest strategies for risk mitigation.

**Design Review:** Review the existing engineering design of the Irrigation infrastructure component and assess its adequacy in withstanding flash floods. Identify weaknesses and areas for improvement.

**Design Modification:** Recommend and design modifications to the existing engineering plans to enhance the system's resilience and ability to withstand flash floods with resilient design in accordance with the magnitude of floods to which these structures come in contact. This may include changes to structures, materials, and drainage systems.

**Hydrological Analysis:** Analyze historical and projected flood data to determine the frequency and intensity of flash floods in the region. This information is critical for designing a system that can cope with the expected conditions.

**Environmental Impact Assessment:** Consider the environmental impact of the proposed modifications and ensure that the design complies with relevant environmental regulations and standards.

**Cost Estimation:** Provide cost estimates for the proposed design modifications, including materials, labor, and any necessary equipment or technology and preparation of detailed Bidding Documents. Adequate budget provisions must be confirmed based on engineering designs and market rates, including price and physical contingencies as appropriate

**Regulatory Compliance:** Ensure that the new design complies with all relevant local, state, and national regulations and standards for irrigation systems and flood control.

**Stakeholder Engagement:** Collaborate with relevant stakeholders, such as government agencies, local communities, and environmental organizations, to gather input and ensure that their concerns and needs are addressed.

**Resilience and Sustainability:** Focus on making the Irrigation infrastructure not only flood-resistant but also environmentally sustainable, ensuring long-term resilience and minimal negative impact on the ecosystem.

**Monitoring and Evaluation:** develop a monitoring and evaluation mechanisms to assess the performance of the modified irrigation system under flood conditions. Make adjustments as needed to improve performance.

**Documentation and Reporting:** Maintain detailed records of the assessment, design modifications, and project progress. Prepare reports and documentation for clients, regulatory authorities, and other stakeholders.

**Quality Control:** develop specified quality standards that should be in line with the provided design that covers the construction and installation basic requirements.

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**a. Detail Description of scope of work for Phase-1 is given below**

The PDNA report would be used as a primary document for the assessment of irrigation schemes and their detail engineering design in accordance with international standards. The comprehensive and detailed analysis with a detailed study will cover the design of major works and bidding documents to be implemented under the project.

The consultants with the assigned task would be responsible for carrying out detailed engineering design of the Projects and services, which would include, along with other things, the following responsibilities.

**i. Collection of Data**

Consultant shall collect available primary and secondary source data related to the study, as well as documents and recommendations of previous studies carried out for the ten irrigation schemes listed in Annexure-1, as well as discussions with Irrigation department, covering the concept and options of the tasks, if necessary, and criteria for future operation.

- Gather primary and secondary data related to the study, including documents and recommendations from past studies.
- Engage in discussions with the Irrigation Department to cover conceptual aspects, options, and operational criteria.

**ii. Review of Data**

Consultant shall review all the data collected through previous feasibility studies and PC-1s such as rainfall and stream flow data, climatic and weather data, topographic data, demographic data or any other data deemed necessary for the feasibility study. Examine and study all of the major structures in the irrigation schemes for Irrigation and relevant infrastructures and that are associated with them. Collect data and information for each major irrigation scheme on water availability, command area, cropping patterns, cropping intensity, water logging, salinity and alkalinity, type of soil texture and structure. It should also give insight on the effectiveness of existing perennial and flood irrigation systems, agricultural outputs, and farmer income and relevant data for schemes.

**iii. Additional Data Collection**

The Consultants shall collect all additional data where required for the assessment of the limitations of the existing perennial and flood irrigation systems, as well as potential irrigation system enhancement measures including metrological data, groundwater data, agricultural data, soil quality data, water quality data, and so on, all of which are required for conducting feasibility studies and designing project components.

**iv. Collection of Baseline Data for Future Performance**

Collection of baseline data will be collected from relevant sources where required that must be agriculture, social, environmental and groundwater, soil quality, water logging & salinity and drainage for future monitoring of the impact of Schemes.

**v. Investigations, Surveys and Analysis**

The consultant must address below investigations where required to the following both for Irrigation infrastructure schemes

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- Topographic Surveys, Geo-technical Investigations, Base Line Environmental and Monitoring Survey, Hydrology Studies and other studies of each proposed site for detail designing of a safe, technically reliable, and economically viable structure.
- Determination of foundation characteristics for design of hydraulic structures. This will be carried out through drilling and geophysical survey.
- Identification of the borrow areas for construction of associated structures and other characteristics of the soil.
- Evaluation of strength parameters by visual observation and testing in laboratory of foundation and construction material; soil profile survey of the culturable command area for carrying out land classification survey in the command and ascertaining soil suitability for different crops. Soil samples at the rate of 1 samples per square kilometer will be sufficient.
- Prepare a Baseline Report pertaining to Environmental and Social conditions in the before-Project status of the project-affected areas if required. The baseline should include quantifiable indicators that allow to monitor environmental and social effects during project's implementation and during project's operation if necessary.
- Impact on Socio-Economic life of communities located at scheme sites, command areas and lower riparian.
- Detailed command area development, agriculture and soil studies to forecast the proposed cropping patterns based on water availability and crop water requirements.

#### **vi. Detailed Engineering Design of Proposed Schemes.**

The Consultant shall furnish copies of all engineering drawings, specifications and bidding documents including geo-technical investigations, material reports and Bill of quantities based on prevailing market rates to Client for review and approval Based on all reviews, data collection reports, technical investigations and analysis the consultant shall carryout the detailed feasibility study of proposed schemes with below mandatory information:

- Preparation of detailed feasibility studies for the proposed project interventions would include technical/engineering studies, hydrological study, soil study, hydro-agronomical study and structural analysis, institutional and economic/financial analysis, and comprehensive environmental and social impact assessments including preparation of a Resettlement Action Plan if needed;
  - Feasibility level designs of all works proposed to be undertaken under the project considering least cost options for works that could perform effectively for a long time with low and robust operation and maintenance (O&M) suitable for the local condition; assistance to Client in establishment of computerized database and periodical updating, project preparation and processing including Government requirements, preparation of the project's institutional arrangement and implementation plan, procurement plan, financial management system, specifications and contract management, and construction supervision plans;
  - Preparation of monitoring and evaluation framework along with establishment of baseline for monitoring indicators as well as intermediate indicators for project implementation and assessment methodology to measure impacts;
  - Preparation of a Plan for Agriculture improvement and development in the basin including analysis of soil;
  - Preparation of BoQ and detailed Bidding Documents. The consultant will be responsible in the Preparation of a bidding dossier with clear technical specifications and other guidelines for contractors.
  - Preparation of a plan for implementation arrangements.
  - Preparation of institutional capacity building program; and
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- Preparation of feasibility level designs and bidding documents of all the projects given above. Technical assistance and training will also be part of the assignment.
- Verification of interim and final payments against the works to be executed by the contractor during implementation phase and ensure proper contract management.

#### **vii. Environment and Social Safeguards Management (condition to requirement)**

Under this item of work, the consultant shall be required to prepare Environmental and Social Safeguards Assessment aligned with the Project's Environment and Social Management Framework (ESMF).

- Conduct environmental and socio-economic surveys where required.
- Preparation of environmental and Social Assessments including preparation of a Resettlement Action Plan if needed; The consultations for the RAP would have been carried out in the Project area and all procedure would be followed according to the existing GOB and World Bank guidelines.
- Identify and assess impacts of the proposed intervention on the environmental and social receptors, and propose relevant mitigation measures according to the mitigation hierarchy.
- Prepare ESMP/ IEE / ESIA / EMMP of each site in accordance with the ESMF of the project if required, and in line with Government of Pakistan/ Government of Balochistan regulations and laws, and World Bank guidelines, and will get approval for each document and package from Balochistan Environment Protection Agency and Balochistan Forest & Wildlife Department.

#### **viii. Operational and Maintenance (O&M) Plan**

The Consultants are required to submit the O&M plan. The contents of O&M plan shall include:

- Details of the project Operation instructions pertaining to dry and flood periods, including flood forecasting.
- Maintenance program for the civil works, access roads, and wells; planned maintenance schedule.
- Surveillance program including visual surveillance, piezometer monitoring, and expert inspections.
- Long term asset management including sediment surveys and sedimentation management measures.
- Emergency preparedness in case of sudden release of water from the weir.

#### **ix. Financial and Economic Analysis**

As first step for financial and economic analysis, all benefits and costs of the project shall be assessed. Irrigation benefits shall be calculated as difference between 'with project' and 'without project' situations. Benefits shall be calculated in financial and economic terms. After the preparation of cost estimates, the concerned expert shall compose cost and benefit streams over the project life, and compute the economic internal rate of return and the net present worth of the project. Sensitivity of results shall be tested for changes in major parameters such as engineering cost estimates, expected years of service, projected yields, product prices and discount rates. The analysis shall establish whether the project is economically viable or not. Adequate consideration is to be given to the management arrangements, and operations and maintenance costs to ensure investments are sustainable from a financial and institutional point of view.

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## **x. Final Report**

- a) Based on the preceding activities Consultant shall prepare a detailed engineering report with the above mentioned requirements. The report shall include detailed designs, cost estimation, drawings, bidding documents etc. The consultant will be responsible in the Preparation of a bidding dossier with clear technical specifications and other guidelines for contractors and all other above information with construction implementation plan for all irrigation schemes with proposed mitigations for potential environmental and social impacts and its indicative budget.

## **3.2 Phase 2: TORs for Construction Supervision**

**The following are the main responsibilities of a consultant during construction supervision works**

- b) The consultant will be responsible to conduct site assessments to determine the suitability of the site for technical, social & financial aspects of the proposed Irrigation infrastructure project with respect to the topography, soil conditions, hydrology, climate and other physical factors that could impact the design of the irrigation system.
- c) The consultant will provide technical support throughout the design process to ensure that the design is appropriate and practical. This includes reviewing and approving contractor's design submissions and providing input during construction.
- d) The consultant will be responsible for ensuring that the construction work is carried out to the required standards and specifications. This includes conducting regular quality control inspections, checking the quality of materials, and ensuring that the construction work is in accordance with the design drawings.
- e) The consultant will develop design specifications based on the technical feasibility studies and site assessments. This includes preparing technical drawings, design calculations, and cost estimates to ensure that the irrigation system is designed to meet the required standards and is cost-effective.
- f) The supervisory consultant will liaise with stakeholders, including local communities, government agencies, and other relevant parties, to ensure that the irrigation system design meets the needs of all stakeholders and is compatible with local conditions.
- g) The Consultant will be responsible for the Preparation of final technical documents (design specifications using suitable design tools, and BOQ bill of quantities).
- h) The consultant will be responsible in the Preparation of a bidding dossier with clear technical specifications and other guidelines for contractors.
- i) The consultant will to assist the project management in procurement process and contract management.
- j) The consultant will be responsible in the management & supervision of the schemes during its implementation stage with in the perspective to build back better.

**Detail Description of scope of work for the above TORs is given below**

***General Duties and Responsibilities of the Consultants are:***

- i. The Consultants will carry out a critical review (if required) of the detailed engineering design prior to the commencement of works to identify anomalies or omissions that constitutes inconsistency in the design and completeness of works. On completion of the review, the Consultant will prepare a report, setting out all findings and recommendations for correcting any deficiency or omissions identified. Notwithstanding these, the Consultant will immediately inform the Client of any deficiency or omission that may have a substantial impact on the Project at the time the defect or omission is uncovered.
  - ii. The consultant will administer the civil work's contracts, make engineering decisions, be responsible for quality assurance, provide general guidance and furnish timely responses to the contractors in all matters relating to the civil works, and ensure that all clauses of the contract agreement between the civil works contractors and CLIENT are adhered to and respected.
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- iii. The consultants will advise CLIENT on all matters relating to the efficient and successful execution of the civil works contracts, and will act at all times to protect the interests of the project and will take all reasonable steps to keep the construction costs to a minimum, consistent with sound economic and engineering practices; and prior to execution work, will prepare a “Contract Administration and Construction Supervision Manual” outlining routines and standard operating procedures to be applied in contract administration and construction supervision, based on sound internationally recognized practice, civil work contract of the project.

## **A- Pre-Execution**

### **a. Manual, Documents & Procedures**

- Prepare Construction Supervision Manual and get its approval from the Client 15 days prior to execution of work.
- Prepare Contract Administration Manual and get its approval from the Client 15 days prior to execution of work.
- Prepare Self-Evaluation System in accordance with ISO 9001: 2015.
- Prepare Standard Operating Procedures (“SOPs”) for Pre-Requisite to Payment Certificate.

### **b. Design Review / Cognizance**

- Consultant will leave no fault or discrepancy, which may cause for delay of project during its execution.
- The consultant is responsible to check survey data provided.
- To verify the data used in design process by the design consultant.
- Consultant shall perform the design review / cognizance prior to mobilization of the contractors.

### **c. Quality Assurance**

- Prepare Project Quality Plan (PQP), Inspection, and Test Plan linked with the specifications.
- Prepare Mock-up Programme and its implementation report.
- Update online Running Distance (“RD”) wise Check request management system, wherein upload check request / test results with evidence of photographs and video clips, if non-conformance, repeat check request.

### **d. Management**

- Prepare the Pre-Construction meeting agenda, and conduct the Pre-construction meeting, record, and distribute the minutes.
- Appoint various members of the Engineer’s construction supervision team as the Engineer’s Assistants (Resident Engineers, Material Engineers, Inspectors, etc.) and notify the Contractor and the Employer, and approve the Contractor’s Representative.
- Verify whether the Performance Security complies with the form provided in the Contract, whether it is in the correct amount and currencies, and notify the Employer accordingly.
- Verify whether the bank guarantee for advance payment is in the form specified under the Contract and in the amount and currencies stated in the Particular Conditions of the Contract.

### **e. Survey**

- Consultant will review the survey work prior to commencement of construction activities.
  - The consultant is responsible for joint survey prior to execution of earthwork with the contractor representative and employer representative
  - Inform the employer promptly regarding any variation from the basic survey data received from the design consultant.
  - All levels and references will be referred to permanent benchmarks.
  - Establish a system for validation of data both levels and RD’s through Real Time Kinematic Positioning (“RTK”) Rover and DGPS, by employer or 3<sup>rd</sup> party.
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## **B- During Execution**

### **a. Contract Administration**

- The Engineer will make sure that all conditions of Contract are fulfilled.
- Issue instruction to the Contractor to commence the works and record as per the contract agreement.
- Verify whether the bank guarantee for advance payment conforms to the Contract requirements and that the guarantee is valid until the entire advance payment is recovered from the Contractor's payment certificates.
- Interpret the specific provisions of the Contract related to the Employer's obligation to give possession of the Site, and the Contractor's Work Program, assess the contractual consequences of any specific land acquisition issue and advise the Employer on the appropriate mitigation measures.
- If required, determine the Contractor's entitlements to time extensions on the basis of the Contractor's Work Program.
- Determine Delay Damages on the basis of the Work Program and advise the Employer of the relevant contractual remedies if the Contractor's progress is behind schedule.
- Verify the sources of indices or prices for price adjustment determine a provisional value of an index/reference price until it is published, but, if the index is not published in certain period(s), apply the last available published value.
- Initiate and process variations promptly when it is necessary for the additional construction of the works.
- Request the Contractor's technical and cost proposal, prior to its determination, as required, consult both parties in all matters in connection to variation work.
- Value variations obtain the Employer's approval of any variation, issue variations under the Contract, keep record of all variations issued under the Contract and report the summary of the variations in the Consultant's Monthly Progress Reports.
- Assess objectively the Contractor's claims and give professional and objective advice to the Employer, consult both parties before determining an extension of time.
- Extension of Time (EOT) – Determine Contractor's claims of EOT on the basis of the Contractor's approved Work Program, the impact of the delay(s) event on the Critical Path and the particulars submitted by the Contractor, and not to act as the Contractor's advisor in this matter.
- Maintain an Events Log since the beginning of Contract.
- Assist the parties establish Dispute Board (DB), provide all necessary information to DB members, and attempt to facilitate amicable settlement of the dispute between the Employer, and the Contractor.

### **b. The Engineer Duties**

- Carry out any subsequent design changes, variation orders and day work orders.
  - Obtain the Client's specific approval before taking any action for determination of extension of time, additional costs and the Contractor's claims for additional time or costs, for all events for which the Employer's express approval is required under the Conditions of Contract.
  - Review and approval of the work program
  - Review the contractor work program with respect to the resources' efficiency such as equipment's efficiency, manpower efficiency and material supply chain and thereafter advise the contractor accordingly.
  - Reviews the Contractor's Work Program and notify the Contractor if the program does not comply with the Contract and advising the contractor to co-opt with the contractual timelines accordingly.
  - Monitor the progress against the Work Program and the cash flow estimate and request revisions, if required.
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- Conduct regular weekly site meetings and monthly progress review meetings, record and distribute the minutes.
- Assess minimum construction equipment, plant and machinery requirements, by type and specification, and monitor, keep and regularly update a list of the Contractors' equipment, plant and machinery in order to keep a check on the Contractors' mobilization. Inspect and evaluate the Contractor's establishments including in particular the laboratory facilities to ensure compliance with the terms and conditions of the Contract.
- Keep and maintain daily records of labour, equipment and weather conditions on the site along with records of activity, progress and other events happening on the site having relevance to the works.

**c. Payment**

- Issue regular notices to the Contractors of intended field measurements, measure the Works, compute the quantities for payment, and determine the amounts due to the Contractor within the period specified in the Contract.
- Establish and maintain throughout the works contracts a structured system of measurement records, supporting documents and calculations for the payment of all BOQs items that is transparent for auditing purposes.
- Issue the interim certificates to Client for payment to the Contractors having regard to any contractual provisions for advance payment, variation of price, and exchange rate fluctuation etc. Certify the completion of the Activities/Works or parts thereof and process final payments to the Contractors.
- Prepare and maintain the Estimates of Cost of Works to Completion continuously, update the Estimates after each Variation instruction or a Variation Order issue and after each Interim Payment Certificate (IPC), and present the latest Estimate in the Consultant's Monthly Progress Reports.

**d. Quality Assurance and Quality Control (QA/QC)**

- Discharge fully the Engineer's obligations with respect to approval of materials and workmanship, approval and auditing of the Contractor's Quality Assurance System and the QA Personnel and the compliance testing by the Engineer.
- Inspect quarries and borrow pits, and crushing plants, and order tests of materials and ensure adherence to specifications and approve the sources of materials.
- Carry out independent testing in the field and/or in the laboratory of the "Engineer/Project Manager" and approve or disapprove and certify the works that conform with the specifications and maintain permanent records of results of all the tests made along with all Check Requests.
- Give notice to Contractors of any defects and deficiencies, and issue instructions for the removal and substitution of the improper works, where provided under the contract. If required, order suspension of the work(s) and/or recommend to CLIENT other recourse available under the Contract.

**e. Insurance**

- Verify whether the form and substance of the evidence of the Contractor's insurances is satisfactory, whether insurance premiums have been paid and the required insurances are effective on the dates required by the Contract.
  - Verify that the terms of the Contractor's insurance policies fully comply with the requirements of the Contract including:
    - whether both the Employer and the Contractor are adequately covered as insured Principals.
    - amounts insured and currencies of payment, validity of the insurance policies, special conditions.
    - limits of insurance per event and in aggregate, deductibles, excess, conditions related to locations; and
-

- Whether and which subcontractors are covered by the insurances, and whether additional insurances will be required if the Contractor engages new subcontractors.
- Monitor whether the Contractor maintains adequate insurance in the course of performance of the Contract, particularly if the Contractor provides insurances for a fixed period which is shorter than the period required under the Contract.
- Advise the Employer on the appropriate action and contractual remedies in case the Contractor does not perform its insurance obligations in accordance with Contract.

**f. Reporting**

- Submit monthly, quarterly and summarized annual reports during construction and thereafter with separate environmental and social Safeguards Monitoring Reports to the Bank and disclose relevant information from such reports to affected people promptly upon submission.
- Report any actual or potential breach of compliance with the measures and requirements set forth in the Environmental and Social Management Plan (“ESMP”), the Site Specific Environmental and Social Management Plan (“SSEMP”) or the Land Acquisition and Resettlement Plan (“LARP”) promptly after becoming aware of the breach.
- Report in the Consultant’s Monthly Report the work progress against the Contractor’s Work Program and the cash flow estimate.
- Regularly monitor and report on the results indicators during the construction period following the schedule of Project reports

**g. Environment, Social, Health and Safety (ESHS)**

- Without relieving the Contractors of their obligations under the Contract, review and approve the traffic management and safety plan, and ensure compliance such that the Works are carried out at all times in a safe and secure manner and damage or injury to persons or property is avoided.
  - If any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project that were not considered in the EIA, the CEIA, the ESMP, the SSEMP or the LARP, promptly inform the Bank of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan.
  - Carry out the following duties related to environmental management with particular reference to the technical requirements of sound environmental standards on the basis of the Environmental Assessment and Review Framework (EARF), the Initial Environmental Examinations (IEEs), and the Environmental Management Plans during construction: (i) review and endorse site specific Environmental and social Management Plans (ESMPs) for the projects sections, prepared by the Contractors; (ii) ensure that all the environmental mitigation measures required to be implemented are incorporated into the contract documents; (iii) ensure that the Contractors comply with the measures and requirements relevant to the contractors set forth in each IEE and ESMP, and any corrective or preventative actions set out in Environment Monitoring Reports; (iv) conduct environmental monitoring and ensure that the day-to-day construction activities are carried out in an environmentally sound and sustainable manner; (v) prepare and submit semi-annual environmental monitoring reports on the implementation of the ‘Environmental and social Management Plan (ESMP) to Client within 14 days after a completion of the monitoring period; (vi) Prepare additional environmental impact assessments, if required, compliant with World Bank’s Environment and Social Safeguards policies;
  - With respect to the prevention of COVID-19, HIV/AIDs and Human Trafficking, monitor that the contractors comply and carry out required actions as provided in the respective contract documents, such as awareness and education of laborers and workers.
  - Ensure that the contractor(s) provide a safe workplace for their workforce, supervisory personnel and for members of the public requiring access through the sites in full conformity with Health and Safety regulations.
-

- Ensure that the contractor(s) comply fully with contractual obligations relating to care of the environment (both specified and legislated) and provide all reports and obtain all permits and permissions required in relation to spoil areas, borrow areas quarries and the like.
- Provide any other specialist services requested by Client under conditions to be mutually agreed ensure that the construction methods as proposed by the contractor for carrying out the works are satisfactory, inspection of contractor's construction equipment; and safety of the works, property, personnel, and general public; the schedule of mitigation measures for adverse environmental impacts.
- Review the Site-Specific Health and Safety Management Plan (SSHSMP) for the Project that is prepared and submitted by the Contractor. Then, make recommendation to the Employer in relation to the approval of the SSHSMP. Communicate the approved SSHSMP to all consultants and contractors throughout all project stages. Should any unforeseen events occur, review the updated SSHSMP and make recommendation to the Employer in relation to the approval of the SSHSMP.
- Prepare the Project Execution Plan, which inter alia, includes how management of SSHSMP is to be addressed throughout all stages of the Project.
- In case of any incident, it is to be reported using ESIRT or newly available tools
- Detailed E&S screening, the necessary safeguard instruments are to be prepared (e.g., Environmental and Social Impact Assessments, ESMP) and suitable mitigation measures for any significant impacts together with any residual project impacts.
- Selected investments shall promote and adhere to international best practice and the requirements of the WBG Environmental, Health, and Safety Guidelines.

**h. Records**

- Establish and maintain an effective documents management system in the Engineer's office, which provides for separate filing of incoming and outgoing correspondence and documents, as well as the filing by subject matter.
- Ensure the receipt of and maintain as permanent records of all warranties required under terms and conditions of the Contract for materials including their source and equipment accepted and incorporated in the project.

**i. Capacity Building**

- Develop training programs for supervisory staff and develop on the job training on innovative construction methods, project management and value engineering.

**j. Audit**

- Provide all necessary assistance to the Client and external auditors for conducting regular quarterly audits of the measurement records, supporting documents and calculations for the payment of all BOQ items.

**k. Completion of Work**

- When the works are completed in accordance with the Contract, issue a Taking over Certificate to the contractor(s).

**C- Post Execution (*Defect Notification Period*)**

- Carry out detailed inspections of the works after notice to engineer for final inspection and performance certificate.
  - Prepare detailed recommendation reports / Punch List and improvement since last inspection, for the Client after each inspection.
  - Issue performance certificate and process final statement and final payment certificate thereafter.
  - Regularly monitor and report on the results indicators during the DNP following the schedule of Project reports
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#### **D- Project Closure**

- The consultant is responsible to prepare all reports to satisfy the requirements of the Bank as well as Government of Balochistan.

#### **E- General Responsibility**

- a. The Consultants will assist the CLIENT with holding stakeholder outreach meetings in the project area to update local communities with project progress. Specific communications materials will be provided to community members in Urdu and English and other languages as appropriate, describing the project, relevant governing the Bank policies and procedures, benefit entitlements, grievance redress mechanism, HIV/AIDs, COVID-19, safe working conditions, etc. A basic tracking system will be maintained to record consultation activities, the provision of project information, to register concerns and/or complaints received, and to track follow-up action.

### **4. Deliverables for Phase-1**

The consultant will deliver the following documents with satisfactory quality that are required at Client's end for approval.

#### **(i) Inception Report**

Inception report for Irrigation infrastructure should provide a comprehensive and detailed plan for the design, construction, and management of the Irrigation infrastructure project, including a clear understanding of the project's objectives, scope, and expected outcomes with below breakup of pre-requisites.

- **Project Overview:** This section provides a brief overview of the project, including its objectives, scope, and expected outcomes.
  - **Site Assessment:** This section provides a detailed assessment of the site, including GIS maps, Geodic coordinates, detail topography, Inventory for structures, soil characteristics, climate, flood risks associated with the site and water availability. It also includes an analysis of any potential environmental and social impacts of the project.
  - **Irrigation Structure Design:** This section outlines the proposed irrigation system design system, including the selection of appropriate equipment, materials, and technologies, as well as the design of hydraulic structures, water distribution systems system.
  - **Project Management:** This section outlines the project management plan, including timelines, budgets, procurement processes, and quality control measures.
  - **Stakeholder Engagement and Consultation:** This section outlines the engagement and consultation process with stakeholders, including local communities, government agencies, and other interested parties.
  - **Financial & Economical Analysis:** This section provides a detailed analysis of the project's financial viability, including a cost-benefit analysis, financing options, and revenue streams.
  - **Risk Assessment and Management:** This section outlines the risks associated with the project, including technical, financial, environmental, and social risks, as well as measures to manage and mitigate these risks.
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- **Monitoring and Evaluation:** This section outlines the monitoring and evaluation plan for the project, including the indicators, methods, and frequency of monitoring and evaluation activities.

**(ii) Assessment Study Report and Detailed Engineering Design.**

The consultant will review the previous design and will modify the design of irrigation structures system with a resilient flood resistant approach where required. The detail engineering design phase of irrigation infrastructure studies system should provide a comprehensive and detailed plan for the design and construction of the irrigation system, taking into account all site-specific factors and requirements. The design should be technically sound, cost-effective, and sustainable, while minimizing any potential negative environmental and social impacts.

The main requirements for detail engineering design in for each irrigation schemes system should be equipped with below information:

A detailed site assessment should be conducted to determine the soil characteristics, topography, hydraulic and hydrologic study, climate, and water availability at the site

The irrigation structure system design should be based on the site assessment and should take into account factors such as drinking water need, irrigation method, and water source. The design should also include detailed plans for hydraulic structures and hydrologic requirements, water distribution systems, and drainage systems for irrigation and other requirement as per site specific.

The selection of appropriate equipment, materials, and technologies for the Irrigation infrastructure schemes should be based on the site assessment and the irrigation infrastructure design. The materials should be durable, cost-effective, and suitable for the specific site conditions.

Detailed bidding drawings and detailing construction specifications should be prepared for all aspects of the Irrigation infrastructure schemes design, including hydraulic structures, water distribution systems, and drainage systems. The drawings and specifications should be clear and detailed to ensure accurate implementation of the design.

Quality control measures should be implemented throughout the detail engineering design phase to ensure that the design meets the required standards and specifications. This may include regular site inspections, testing of materials and equipment, and monitoring of construction activities.

A detailed cost estimation, Bidding documents, BOQ, Engineer's Estimate etc should be prepared for the Irrigation infrastructure schemes design, including all materials, equipment, labor, and other costs associated with the project. The cost estimation should be based on accurate and up-to-date information to ensure that the project is financially viable.

The detail engineering design should take into account the potential environmental and social impacts of the Irrigation infrastructure schemes, and appropriate measures should be taken to mitigate any negative impacts.

The consultant will also demonstrate the results of assessment study in this report. The report will show all relevant engineering, social and environmental considerations given in the studies including but not limited to the following:

- Assess the viability of existing design and its improvement by keeping in view the climate change impacts.
  - Measures to minimize environmental and social impacts.
  - Economic analysis and assessing the viability of the sub-projects.
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#### 4.1.1 Schedule of reports for Phase-1

**Table-1 Key deliverables and delivery schedule for Phase-1**

#	Document	Copies	Due
1	Inception Report	05	07 days after the effectiveness of the Consulting Services Agreement
2	Preliminary Site Assessment Report - Flood Risk Analysis Report	05	30 days after the effectiveness of the Consulting Services Agreement
3	<ul style="list-style-type: none"> <li>• Hydrological Analysis Report- Historical Flood Data Analysis,</li> <li>• Initial Design Proposal</li> <li>• Initial Drawings and Specifications</li> </ul>	05	60 days after the effectiveness of the Consulting Services Agreement
4	<ul style="list-style-type: none"> <li>• Final Design Modifications Report</li> <li>• Detailed Design Drawings for 27 Irrigation scheme and Final Cost Estimation</li> <li>• Bidding Documents</li> </ul>	05	90 days after the effectiveness of the Consulting Services Agreement
5	<ul style="list-style-type: none"> <li>• IEE/EIA and ESMP Report</li> <li>• Quality Control Report</li> <li>• Monitoring and Evaluation Plan</li> <li>• Project Management Plan:</li> </ul>	05	120 days after the effectiveness of the Consulting Services Agreement
6	<ul style="list-style-type: none"> <li>• Final Design Modifications Report for the remaining 28 Irrigation scheme and</li> <li>• Detailed Design Drawings for the remaining 28 Irrigation scheme</li> <li>• Final Cost Estimation for the remaining 28 Irrigation scheme</li> <li>• Bidding Documents Preparation for the remaining 28 Irrigation scheme</li> </ul>	05	180 days after the effectiveness of the Consulting Services Agreement
7	<ul style="list-style-type: none"> <li>• Regulatory Compliance Report</li> <li>• NOC on Environment Impact Assessment (EIA) and Initial Environment Impact Assessment of the project from Balochistan Environment Protection Agency (SEPA) and Balochistan Forest and Wildlife Department</li> </ul>	05	150 days after the effectiveness of the Consulting Services Agreement

**Note**

\* The consultant is required to deliver the detailed design and bidding documentation for 27 irrigation schemes within 90 days of signing the contract. The remaining 28 irrigation schemes projects must be completed within 180 days.

## 4.2 Deliverables for Phase -2 - Construction Supervision

**Inception Report:** The Construction Supervision Inception Report for Irrigation infrastructure restoration should be a comprehensive document that provides a detailed roadmap for the construction process, including planning, execution, monitoring, and reporting, to ensure the successful completion of the project.

Inception Report should include the following basic requirements:

**Project Description:** The report should provide a detailed description of the Irrigation infrastructure project, including the project's objectives, scope, and purpose.

**Project Organization:** The report should outline the organizational structure of the project, including the roles and responsibilities of the project owner, the construction supervisor, and the contractor.

**Construction Management Plan:** The report should include a construction management plan that outlines how the construction process will be managed, including quality control, safety measures, and risk management.

**Schedule:** The report should include a detailed schedule that outlines the timeline for each phase of the construction process, including start and end dates.

**Budget:** The report should include a detailed budget that outlines the costs associated with the construction process, including materials, labor, and equipment.

**Resource Allocation:** The report should include a plan for resource allocation, including the necessary equipment, materials, and labor required to complete the project.

**Stakeholder Communication Plan:** The report should outline a communication plan for all stakeholders involved in the project, including how information will be shared and disseminated.

**Environmental and Social Safeguards:** The report should include an environmental and social safeguards plan that outlines measures to mitigate any potential negative impacts on the environment and local communities.

**Reporting and Monitoring:** The report should include a reporting and monitoring plan that outlines how progress will be tracked, monitored, and reported throughout the construction process.

**Risk Assessment:** The report should include a risk assessment plan that outlines how risks associated with the construction process will be identified, assessed, and managed throughout the project.

### Monthly Progress Report:

Monthly Progress Report shall provide to PMU with a clear and transparent update on the project's progress, challenges, and achievements during the reporting period.

Monthly Progress Report should include the following information:

**Project Overview:** The report should provide a brief overview of the project, including its objectives, scope, and purpose.

**Project Status:** The report should include an update on the project's current status, including progress made during the reporting period.

**Milestones:** The report should list any milestones achieved during the reporting period and any upcoming milestones.

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**Schedule:** The report should include a status update on the project's schedule, including any delays, changes, or adjustments made during the reporting period.

**Budget:** The report should provide an update on the project's budget, including any changes or adjustments made during the reporting period.

**Resources:** The report should provide an update on the resources allocated to the project, including equipment, materials, and labor.

**Quality Control:** The report should provide an update on the project's quality control measures, including any issues or concerns that arose during the reporting period.

**Safety:** The report should include an update on the project's safety measures, including any incidents, accidents, or near-misses that occurred during the reporting period.

**Environmental and Social Safeguards:** The report should provide an update on the project's environmental and social safeguards, including any measures taken to mitigate negative impacts on the environment or local communities.

**Stakeholder Communication:** The report should provide an update on stakeholder communication and engagement during the reporting period, including any issues or concerns raised by stakeholders.

**Risks and Issues:** The report should identify any risks or issues that arose during the reporting period and outline any measures taken to address them.

**Recommendations:** The report should include any recommendations or suggestions for improving the project's progress, schedule, budget, or quality.

### **Quality Assurance Plan (QA/QC Manual):**

The consultant must provide the Quality Assurance Plan (QA/QC Manual) in a comprehensive manner that outlines the consultant's quality control and quality assurance procedures, to meet the consultant's work standards and regulations, and that the project is completed successfully. It must include the following:

**Introduction:** The QA/QC Manual should begin with an introduction that explains the purpose of the document, the scope of the consultant's services, and the standards and regulations that the consultant will adhere to.

**Organizational Structure:** The QA/QC Manual should describe the organizational structure of the consultant's team, including the roles and responsibilities of each team member.

**Quality Control Procedures:** The QA/QC Manual should outline the consultant's quality control procedures, including how the consultant will ensure that all work meets the required standards and regulations. This should include procedures for design review, documentation review, and testing.

**Quality Assurance Procedures:** The QA/QC Manual should describe the consultant's quality assurance procedures, including how the consultant will monitor and evaluate the quality of the work being performed. This should include procedures for audits, inspections, and reviews.

**Document Control Procedures:** The QA/QC Manual should outline the consultant's document control procedures, including how the consultant will manage and store all project-related documents, such as drawings, specifications, and reports.

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**Training and Development:** The QA/QC Manual should describe the consultant's training and development procedures, including how the consultant will ensure that all team members are properly trained and qualified to perform their duties.

**Subcontractor Management:** The QA/QC Manual should outline the consultant's procedures for managing subcontractors, including how the consultant will ensure that all subcontractors meet the required standards and regulations.

**Health and Safety:** The QA/QC Manual should describe the consultant's health and safety procedures, including how the consultant will ensure that all work is performed safely and in compliance with applicable regulations.

**Non-Conformance Reporting:** The QA/QC Manual should include procedures for reporting and addressing any non-conformances or deficiencies that are identified during the project.

**Performance Monitoring and Reporting:** The QA/QC Manual should outline how the consultant will monitor and report on the performance of the quality control and quality assurance procedures.

**Quarterly Progress Report (Physical & Financial):**

Consultant should include the below information in the Quarterly Progress Report (Physical & Financial):

**Introduction:** The report should begin with an introduction that explains the purpose of the document, the scope of the consultant's services, and the standards and regulations that the consultant is adhering to.

**Project Overview:** The report should provide a brief overview of the project, including its objectives, scope, and purpose.

**Physical Progress:** The report should include an update on the physical progress of the project, including the status of construction work, any delays or obstacles encountered, and any changes or adjustments made to the project schedule.

**Financial Progress:** The report should provide an update on the financial progress of the project, including the budget status, any expenditures made during the reporting period, and any changes or adjustments made to the project budget.

**Milestones:** The report should list any milestones achieved during the reporting period and any upcoming milestones.

**Resources:** The report should provide an update on the resources allocated to the project, including equipment, materials, and labor.

**Quality Control:** The report should provide an update on the project's quality control measures, including any issues or concerns that arose during the reporting period.

**Safety:** The report should include an update on the project's safety measures, including any incidents, accidents, or near-misses that occurred during the reporting period.

**Environmental and Social Safeguards:** The report should provide an update on the project's environmental and social safeguards, including any measures taken to mitigate negative impacts on the environment or local communities.

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**Stakeholder Communication:** The report should provide an update on stakeholder communication and engagement during the reporting period, including any issues or concerns raised by stakeholders.

**Risks and Issues:** The report should identify any risks or issues that arose during the reporting period and outline any measures taken to address them.

**Recommendations:** The report should include any recommendations or suggestions for improving the project's progress, schedule, budget, or quality.

**Conclusion:** The report should conclude with a summary of the project's progress during the reporting period and an overview of any upcoming activities or milestones.

### **Annual Progress Report (Physical & Financial):**

The Annual Progress Report (Physical & Financial) should include the following information:

**Introduction:** The report should begin with an introduction that explains the purpose of the document, the scope of the project, and the standards and regulations that the project is adhering to.

**Project Overview:** The report should provide an overview of the project, including its objectives, scope, and purpose.

**Physical Progress:** The report should include an update on the physical progress of the project, including the status of construction work, any delays or obstacles encountered, and any changes or adjustments made to the project schedule.

**Financial Progress:** The report should provide an update on the financial progress of the project, including the budget status, any expenditures made during the reporting period, and any changes or adjustments made to the project budget.

**Milestones:** The report should list any milestones achieved during the reporting period and any upcoming milestones.

**Resources:** The report should provide an update on the resources allocated to the project, including equipment, materials, and labor.

**Quality Control:** The report should provide an update on the project's quality control measures, including any issues or concerns that arose during the reporting period.

**Safety:** The report should include an update on the project's safety measures, including any incidents, accidents, or near-misses that occurred during the reporting period.

**Environmental and Social Safeguards:** The report should provide an update on the project's environmental and social safeguards, including any measures taken to mitigate negative impacts on the environment or local communities.

**Stakeholder Communication:** The report should provide an update on stakeholder communication and engagement during the reporting period, including any issues or concerns raised by stakeholders.

**Risks and Issues:** The report should identify any risks or issues that arose during the reporting period and outline any measures taken to address them.

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**Lessons Learned:** The report should include a section that outlines any lessons learned during the reporting period, including any improvements that can be made to the project's progress, schedule, budget, or quality.

**Recommendations:** The report should include any recommendations or suggestions for improving the project's progress, schedule, budget, or quality.

**Conclusion:** The report should conclude with a summary of the project's progress during the reporting period and an overview of any upcoming activities or milestones.

**Table 2. Key deliverables and delivery schedule for Phase-2 Assignment**

#	Document	Copies	Due
1	Inception Report	5	15 days after the effectiveness of the Consulting Services Agreement
2	Monthly Progress Report (Physical & Financial)	10	10 <sup>th</sup> of the each month
3	Quality' Assurance Plan (QA/QC Manual)	10	Before starting the physical activities
4	Quarterly Progress Report (Physical & Financial)	10	10 <sup>th</sup> of the first month of following quarter
5	Annual Progress Report (Physical & Financial)	10	10 <sup>th</sup> of the first month of following year
6	Quality Control / Assurance Report	10	After Every 3 months
7	Revised PC-I	10	As and when required based on the inter component adjustment
8	Final Assignment Completion Report	10	At completion of works as well as financial transactions
9	Planning Commission Proforma-IV (PC-IV)	25	At completion of each sub - project
10	Complete inventory of works/activities completed	1	At completion of each sub- project
11	Special Reports including Bidding Documents, Screening Reports, Design Reports, Working Drawings. Variation Orders, Bid Evaluation Reports, Various Forms.	10	As and when required

### **Delivery of Documents**

The consultant must provide below documents during supervision of work.

**Table-3 Delivery of Documents**

<b>Documents</b>	<b>No of Sets</b>
Bidding Drawings	03 Sets
Construction Drawings	03 Sets
Bill of Quantities	03 Sets
Technical Specifications for each payable item Comprising of: - Description - Material Requirement	03 Sets

<b>Documents</b>	<b>No of Sets</b>
<ul style="list-style-type: none"> <li>- Construction Requirement/Method of Working (Techniques)</li> <li>- Equipment to be used</li> <li>- Testing and quality control</li> <li>- Method of measurement &amp; payment</li> </ul>	
Bidding/ Contract Documents Comprising of: <ul style="list-style-type: none"> <li>- Invitation for Bid</li> <li>- Instruction to Bidder</li> <li>- Form of Contract</li> <li>- General Conditions of Contract (GCC)</li> <li>- Particular Conditions of Contract (PCC)</li> <li>- Rate Analysis of Non-Schedule Items</li> <li>- Bill of Quantities</li> </ul>	03 Sets
Proforma including: <ul style="list-style-type: none"> <li>- Engineer's cost Estimate</li> <li>- Geo Technical Investigation</li> <li>- Hydrology and Hydraulic study report</li> <li>- Economic analysis</li> </ul>	03 Sets
Back-up calculation of BOQs in MS-Excel or MS-Word	03 Sets
Soft copies of all documents mentioned above in relevant software file extension [3 CDs / DVD each (along with USB)]	

### **Mode of Payment for Services under Phase-1**

#### **Mode of Payment for Services under Phase-1**

“A” is the **Contract amount**, excluding of (i) Provisional Sum; (ii) Contingency; and (iii) Indirect Local Tax.

<b>S/No</b>	<b>Activity</b>	<b>Percentage of “A”</b>	<b>Days</b>
1	Inception Report / Pre-Feasibility Report Preliminary Site Assessment Report, Flood Risk Analysis Report	03%	30
2	Detailed Engineering Design, EIA/IEE and ESMP with Cost Estimates, Bidding Drawings and Technical Specifications for 27 Irrigation	5%	60
3	Quality Control Report, Monitoring and Evaluation Plan. Project Management Plan:	2 %	30
4	Bidding Documents and Construction Drawings for total 55 irrigation schemes	5%	60
<b>Total</b>		<b>15%</b>	<b>180</b>

## **Mode of Payment for Services under Phase-2 (Supervision)**

The payment method for services under the remaining 85 % of budget in Phase-2 regarding supervision Phase will be determined by the monthly remuneration of the staff and other related activities, calculated based on the actual number of man-months and activities consumed by the consultant staff.

### **5. Staffing and Deployment**

Table 6 provides a preliminary estimate (subject to change) of the person-months required for the entire assignment. Prospective Project supervisory consultants (PSC) should propose a staffing plan and skill mix necessary to meet the objectives and the scope of work. However, to ensure an equitable evaluation of financial proposals, prospective consultants should not reduce the overall time commitment of the key staff.

Firms are encouraged to use national expertise & experience and to use the Balochistan expertise to the extent possible. If all the required skills are not available within a single consulting firm, a joint venture with other firms should be proposed. Additionally, firms are strongly encouraged to ensure a gender balance across the team, and to ensure appropriate skills and experience in gender issues relevant to Project implementation.

**Table 6. Expected Staffing Requirement**

No.	Position	Staff Months
<b>A. Key Staff for Phase 1 and Phase 2</b>		
1	Team Leader	48
2	Contract Engineer	42
3	GIS and Data Manager	8
4	Chief Resident Engineer	42
5	Hydraulic Design Engineer	48
6	Agriculture Engineering Specialist	24
	Sub Total (A)	212
<b>B. Non Key Staff</b>		
<b>B-1 Engineering Design (06 Months) for Phase-1</b>		
8	Irrigation Engineer/ (02)	12
9	Geotechnical Engineer (01)	6
10	Structural Engineer (01)	6
11	Junior Engineer (10)	60
12	CAD Operators (02)	12
13	Quantity Surveyors (05)	30
14	Field Surveyors (05)	30
15	Computer Operators (02)	12
	Total	168
<b>B-2 Engineering Supervision for Phase-2</b>		
16	Resident Engineer (3 Positions)	126
17	Material Engineer (2 Positions)	84
18	Site Supervision Engineers(10 Positions)	420
19	Site Surveyors(10 Positions)	420

No.	Position	Staff Months
20	Environmental Engineer/ Environmental Compliance Expert (2 Positions)	84
B-3	Sociologist /Social and Community Organizers (2 Positions)	84
Support Staff ( Phase-1 and Phase-2)		
21	Legal Expert (01)	42
22	IT Specialist (02)	42
23	Other Staff (06)	210
	Sub Total (B)	1554
	<b>Grand Total</b>	<b>1934</b>

S.No.	Description	Man Months
1	Key Staff	<b>212</b>
2	Non- Key Staff	<b>1722</b>

## 5.1 Requirements for Key Staff:-

### *1. Designation: Team Leader*

Responsibilities:

1. Lead and manage the overall implementation of irrigation engineering design and supervision projects funded by the World Bank.
2. Provide strategic direction and technical guidance to project team members, ensuring the successful achievement of project objectives and deliverables.
3. Coordinate with project stakeholders, including government agencies, implementing partners, and local communities, to facilitate effective project implementation and stakeholder engagement.
4. Oversee project planning, budgeting, and monitoring activities, ensuring adherence to project timelines, budgets, and quality standards.
5. Serve as the primary point of contact for the World Bank and other project stakeholders, providing regular updates on project progress, challenges, and achievements.
6. Conduct periodic project reviews and evaluations to assess project performance, identify lessons learned, and recommend improvements for future projects.
7. Manage project risks and issues, proactively identifying and addressing challenges to ensure project success.
8. Foster a collaborative and inclusive team environment, promoting knowledge sharing, capacity building, and professional development among project team members.

Experience:

- Minimum of 15 years of experience in managing large-scale irrigation engineering projects, including experience as a team leader or project manager on similar projects.

- Strong technical background in irrigation engineering, with expertise in hydraulic design, water resources management, and agricultural engineering.
- Demonstrated experience in leading multidisciplinary teams and managing complex projects in diverse cultural and geographical settings.
- Proven track record of successfully delivering projects on time, within budget, and to the satisfaction of stakeholders.

Qualifications:

- Bachelor's or Master's degree in Civil Engineering, Water Resources Engineering, or a related field from a recognized institution.
- Professional engineering license or certification in irrigation engineering or related discipline preferred.
- Excellent leadership, communication, and interpersonal skills, with the ability to effectively engage with diverse stakeholders and build consensus.
- Strong project management skills, including proficiency in project planning, budgeting, monitoring, and evaluation.
- Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.

## ***2. Designation: Contract Engineer***

Responsibilities:

1. Manage the procurement process for construction contracts, including preparation of bidding documents, bid evaluation, and contract negotiation, in compliance with World Bank procurement regulations.
2. Coordinate with project stakeholders, including government agencies, contractors, and consultants, to ensure timely and efficient implementation of construction contracts.
3. Review and analyze contractor submissions, including technical proposals, bid prices, and qualifications, to assess compliance with project requirements and evaluate value for money.
4. Provide technical support and guidance to project team members on contract administration, including contract interpretation, change management, and dispute resolution.
5. Monitor contractor performance and progress against contractual milestones, conducting site visits and inspections as needed to verify quality, safety, and adherence to specifications.
6. Prepare progress reports, contract variations, and other contractual documentation for review and approval by project management and funding agencies.
7. Ensure compliance with environmental and social safeguards requirements throughout the procurement and implementation of construction contracts.
8. Support capacity building and knowledge transfer activities to enhance the procurement capacity of project counterparts and stakeholders.

Experience:

- Minimum of 10 years of experience in contract management and procurement, preferably in the context of infrastructure projects.
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- Demonstrated experience in managing procurement processes, including preparation of bidding documents, bid evaluation, and contract negotiation,
- Strong technical background in civil engineering, construction management, or related field, with expertise in contract administration, construction supervision, and quality assurance.
- Experience working in multicultural and multidisciplinary teams, with the ability to effectively communicate and collaborate with diverse stakeholders.
- Familiarity with environmental and social safeguards policies and requirements, as well as project management principles and practices.

Qualifications:

- Bachelor's or Master's degree in Civil Engineering, Construction Management, Procurement, or a related field from a recognized institution.
- Professional certification in contract management, procurement, or related discipline preferred.
- Excellent analytical, negotiation, and communication skills, with the ability to effectively manage contractual relationships and resolve disputes.
- Proficiency in project management software and Microsoft Office applications, with the ability to generate reports, analyze data, and track project progress.
- Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.

### ***3. Designation: GIS and Data Manager***

Responsibilities:

1. Develop and maintain Geographic Information Systems (GIS) databases and spatial datasets for irrigation engineering projects, including geospatial data collection, analysis, and visualization.
2. Conduct spatial analysis and modeling to support project planning, design, and decision-making processes, including land use planning, water resource management, and environmental impact assessment.
3. Collaborate with project team members to integrate GIS data and analysis into engineering design and supervision activities, ensuring alignment with project objectives and requirements.
4. Provide technical support and training to project staff and stakeholders on GIS tools and techniques, including data collection, manipulation, and interpretation.
5. Manage and update project-related databases, including project documentation, progress reports, and spatial datasets, to ensure accuracy, completeness, and accessibility of project information.
6. Generate maps, charts, and other visualizations to communicate project findings, results, and recommendations to project stakeholders and decision-makers.
7. Support monitoring and evaluation activities by collecting, analyzing, and reporting spatial data on project performance, impacts, and outcomes.
8. Ensure compliance with data management standards, including data security, privacy, and confidentiality, and adhere to relevant ethical and legal requirements.

Experience:

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- Minimum of 5-8 years of experience in geographic information systems (GIS) and data management, preferably in the context of engineering or infrastructure projects.
- Demonstrated experience in developing and managing GIS databases, conducting spatial analysis, and producing maps and visualizations to support project planning and decision-making.
- Proficiency in GIS software and tools, such as ArcGIS, QGIS, and Google Earth, as well as data management platforms and techniques for data collection, processing, and storage.
- Experience working with multidisciplinary teams and stakeholders to integrate GIS data and analysis into engineering design and supervision activities.
- Familiarity with environmental and social safeguards requirements, as well as project management principles and practices.
- Excellent communication, interpersonal, and teamwork skills, with the ability to effectively collaborate with diverse stakeholders and translate technical information into actionable insights.

Qualifications:

- Bachelor's or Master's degree in Geographic Information Systems, Geography, Environmental Science, Civil Engineering, or a related field from a recognized institution.
- Professional certification in GIS or related discipline preferred.
- Strong analytical and problem-solving skills, with the ability to interpret and analyze complex spatial data and provide meaningful insights and recommendations.
- Proficiency in programming languages and scripting tools for GIS data analysis and automation, such as Python, R, or SQL, is advantageous.
- Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.

#### **4. *Designation: Chief Resident Engineer***

Responsibilities:

1. Provide technical leadership and oversight for the construction and supervision of irrigation engineering projects, ensuring compliance with design specifications, quality standards, and safety requirements.
  2. Manage and coordinate construction activities, including earthworks, concrete works, and structural installations, to ensure timely and efficient project delivery.
  3. Supervise and direct site staff, including engineers, technicians, and laborers, to ensure that work is performed safely, accurately, and in accordance with project plans and specifications.
  4. Conduct regular site inspections and quality control checks to monitor construction progress, identify issues or deviations from the design, and implement corrective actions as needed.
  5. Review and approve contractor submittals, including shop drawings, material samples, and method statements, to ensure compliance with project requirements and specifications.
  6. Coordinate with project stakeholders, including government agencies, contractors, and consultants, to resolve technical issues, address concerns, and facilitate project progress.
  7. Prepare progress reports, construction documentation, and other project deliverables for review and approval by project management and funding agencies.
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8. Ensure compliance with environmental and social safeguards requirements, as well as health and safety regulations, throughout the construction process.
9. Provide technical support and guidance to project staff and stakeholders, including training and capacity building activities to enhance construction management skills and knowledge transfer.

Experience:

- Minimum of 15 years of experience in construction management and supervision, with a focus on irrigation engineering projects, similar to ones stated in TOR.
- Strong technical background in civil engineering, with expertise in structural design, hydraulic engineering, and construction materials and methods.
- Demonstrated experience in managing large-scale construction projects, including experience as a resident engineer or construction manager on infrastructure projects.
- Proven track record of successfully delivering projects on time, within budget, and to the satisfaction of stakeholders, with a focus on quality and safety.
- Experience working in multicultural and multidisciplinary teams, with the ability to effectively communicate and collaborate with diverse stakeholders.
- Familiarity with environmental and social safeguards policies and requirements, as well as project management principles and practices.

Qualifications:

- Bachelor's or Master's degree in Civil Engineering, Construction Management, or a related field from a recognized institution.
- Professional engineering license or certification preferred.
- Excellent leadership, communication, and interpersonal skills, with the ability to effectively manage construction teams and resolve technical issues.
- Proficiency in construction management software and Microsoft Office applications, with the ability to generate reports, analyze data, and track project progress.
- Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.

## **5. *Designation: Hydraulic Design Engineer***

Responsibilities:

1. Lead and manage the hydraulic design and analysis of irrigation infrastructure projects, including canals, dams, weirs, and distribution networks, to optimize water distribution efficiency and improve irrigation performance.
  2. Conduct detailed hydraulic modeling and simulation studies to evaluate water flow, pressure, and distribution within the irrigation system, identifying design parameters and optimizing system performance.
  3. Develop design criteria, technical specifications, and engineering standards for hydraulic components and structures, ensuring compliance with regulatory requirements and project objectives.
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4. Coordinate with multidisciplinary teams, including civil engineers, hydrologists, and environmental specialists, to integrate hydraulic design considerations into overall project planning and implementation.
5. Utilize Geographic Information Systems (GIS) and other spatial analysis tools to incorporate topographic, land use, and environmental data into hydraulic modeling and design processes.
6. Provide technical support and guidance to project staff and stakeholders on hydraulic engineering principles, design methodologies, and best practices.
7. Prepare detailed engineering drawings, plans, and calculations for hydraulic structures and components, ensuring accuracy, completeness, and adherence to design specifications.
8. Review and analyze contractor submissions, including design proposals and construction plans, to ensure compliance with hydraulic design requirements and project specifications.
9. Conduct site inspections and field surveys to verify hydraulic design parameters, assess construction progress, and identify issues or deviations from the design.
10. Prepare technical reports, presentations, and documentation to communicate design findings, recommendations, and solutions to project stakeholders and decision-makers.

Experience:

- Minimum of 10 years of experience in hydraulic engineering design and analysis, with a focus on irrigation infrastructure projects, similar to ones stated in TOR Strong technical background in hydraulic engineering, with expertise in open channel flow, pipe flow, and hydraulic structure design and analysis.
- Demonstrated experience in conducting hydraulic modeling and simulation studies using software such as HEC-RAS, SWMM, and EPANET or equal, as well as proficiency in GIS and spatial analysis tools.
- Experience working in multicultural and multidisciplinary teams, with the ability to effectively communicate and collaborate with diverse stakeholders.
- Familiarity with environmental and social safeguards policies and requirements, as well as project management principles and practices.

Qualifications:

- Bachelor's or Master's degree in Civil Engineering, Hydraulic Engineering, Water Resources Engineering, or a related field from a recognized institution.
  - Professional engineering license or certification preferred.
  - Excellent analytical, problem-solving, and communication skills, with the ability to translate technical information into actionable insights and recommendations.
  - Proficiency in hydraulic modeling software, GIS tools, and other relevant engineering software applications.
  - Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.
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## **6. Designation: Agricultural Engineering Specialist**

### Responsibilities:

1. Provide technical expertise and guidance on agricultural engineering aspects of irrigation projects, including crop water requirements, irrigation scheduling, and agronomic practices, to optimize agricultural productivity and water use efficiency.
2. Conduct field assessments and surveys to evaluate existing agricultural practices, water management systems, and crop performance, identifying opportunities for improvement and innovation.
3. Collaborate with multidisciplinary teams, including irrigation engineers, agronomists, and socio-economic specialists, to integrate agricultural engineering considerations into overall project planning and design.
4. Develop crop water demand models, irrigation scheduling tools, and decision support systems to assist farmers in optimizing irrigation practices and maximizing crop yields.
5. Provide technical support and training to project staff and stakeholders on agricultural engineering principles, practices, and technologies, including drip irrigation, sprinkler irrigation, and precision agriculture.
6. Conduct outreach and extension activities to disseminate best practices and technologies in agricultural engineering to farmers and agricultural stakeholders, promoting adoption and uptake of innovative solutions.
7. Assess the socio-economic and environmental impacts of agricultural engineering interventions, including water-saving technologies, soil conservation measures, and crop diversification strategies.
8. Prepare technical reports, publications, and presentations to communicate research findings, recommendations, and lessons learned to project stakeholders, policymakers, and the broader agricultural community.

### Experience:

- Minimum of 10 years of experience in agricultural engineering, with a focus on irrigation and water management, similar to ones stated in TOR Strong technical background in agronomy, crop science, soil and water management, and agricultural engineering principles and practices.
- Demonstrated experience in conducting field assessments, surveys, and research studies to evaluate agricultural practices, water use efficiency, and crop performance.
- Experience working in multicultural and multidisciplinary teams, with the ability to effectively communicate and collaborate with diverse stakeholders.
- Familiarity with environmental and social safeguards policies and requirements, as well as project management principles and practices.

### Qualifications:

- Bachelor's or Master's degree in Agricultural Engineering, Agronomy, Crop Science, Soil and Water Management, or a related field from a recognized institution.
  - Professional certification or licensure in agricultural engineering or related discipline preferred.
  - Excellent analytical, problem-solving, and communication skills, with the ability to translate technical information into actionable insights and recommendations.
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- Proficiency in agricultural engineering software and tools, including irrigation scheduling models, crop simulation models, and geographic information systems (GIS).
- Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.

## **7. *Designation: Irrigation Engineer***

Responsibilities:

- Design and analyze irrigation systems, including canals, pipelines, and water distribution networks, to optimize water use efficiency and crop yield.
- Conduct hydraulic modeling and simulation studies to evaluate water flow, pressure, and distribution within the irrigation system.
- Develop technical specifications, drawings, and design calculations for irrigation infrastructure components.
- Coordinate with multidisciplinary teams to integrate irrigation design considerations into overall project planning and implementation.
- Conduct site visits and inspections to assess existing irrigation infrastructure and identify opportunities for improvement.
- Provide technical support and guidance to project staff and stakeholders on irrigation engineering principles and practices.
- Prepare engineering reports, presentations, and documentation to communicate design findings and recommendations.
- Experience:
  - Bachelor's or Master's degree in Civil Engineering, Agricultural Engineering, or a related field.
  - 2-5 years of experience in irrigation engineering or related field.
  - Proficiency in hydraulic modeling software and CAD tools.
  - Strong communication and teamwork skills.
- Qualifications:
  - Bachelor's or Master's degree in Civil Engineering, Agricultural Engineering, or a related field.
  - Strong technical skills in hydraulic modeling and CAD software.
  - Excellent communication and teamwork skills.

## **8. *Designation: Geotechnical Engineer***

Responsibilities:

- Conduct geotechnical investigations and soil testing to assess soil properties, stability, and bearing capacity for infrastructure projects.
  - Analyze geotechnical data and prepare geotechnical reports, including recommendations for foundation design and slope stability.
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- Design and supervise construction of foundations, retaining structures, and earthworks, ensuring compliance with design specifications.
- Provide technical support and guidance on geotechnical engineering issues to project staff and stakeholders.
- Conduct field inspections and monitoring to assess ground conditions and address geotechnical challenges during construction.
- Experience:
- Bachelor's or Master's degree in Geotechnical Engineering, Civil Engineering, or a related field.
- 2-5 years of experience in geotechnical engineering or related field.
- Proficiency in geotechnical analysis software and field testing techniques.
- Strong communication and problem-solving skills.
- Qualifications:
- Bachelor's or Master's degree in Geotechnical Engineering, Civil Engineering, or a related field.
- Proficiency in geotechnical analysis software and field testing techniques.
- Excellent communication and problem-solving skills.

## **9. *Designation: Structural Engineer***

Responsibilities:

- Design and analyze structural components and systems for infrastructure projects, including buildings, bridges, and dams.
  - Conduct structural calculations and simulations to evaluate structural performance and ensure compliance with design standards.
  - Prepare technical specifications, drawings, and design reports for structural elements.
  - Coordinate with architects, engineers, and contractors to integrate structural design considerations into overall project planning and implementation.
  - Conduct site visits and inspections to assess existing structures and identify opportunities for reinforcement or rehabilitation.
  - Experience:
  - Bachelor's or Master's degree in Structural Engineering, Civil Engineering, or a related field.
  - 2-5 years of experience in structural engineering or related field.
  - Proficiency in structural analysis software and CAD tools.
  - Strong communication and problem-solving skills.
  - Qualifications:
  - Bachelor's or Master's degree in Structural Engineering, Civil Engineering, or a related field.
  - Proficiency in structural analysis software and CAD tools.
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- Excellent communication and problem-solving skills.

## ***10. Designation: Junior Engineer***

Responsibilities:

- Assist senior engineers in design, analysis, and supervision tasks for infrastructure projects.
- Conduct field inspections and data collection to support engineering assessments and evaluations.
- Prepare technical drawings, reports, and documentation under the guidance of senior engineers.
- Assist in coordination and communication with project stakeholders, contractors, and consultants.
- Provide support for project planning, scheduling, and budgeting activities.
- Experience:
  - Bachelor's degree in Civil Engineering, Agricultural Engineering, or a related field.
  - Entry-level position with 0-2 years of experience.
  - Basic knowledge of engineering principles and practices.
  - Strong willingness to learn and develop technical skills.
- Qualifications:
  - Bachelor's degree in Civil Engineering, Agricultural Engineering, or a related field.
  - Strong willingness to learn and develop technical skills.
  - Good communication and teamwork skills.

## ***11. Designation: CAD Operators***

Responsibilities:

- Prepare technical drawings and plans using computer-aided design (CAD) software.
  - Assist engineers and designers in developing detailed engineering drawings and specifications.
  - Ensure accuracy, completeness, and adherence to design standards and specifications.
  - Collaborate with engineering teams to incorporate design changes and revisions.
  - Maintain and update CAD files and documentation as needed.
  - Experience:
    - Diploma or certificate in CAD drafting or related field.
    - 2-5 years of experience as a CAD operator in engineering or architectural firms.
    - Proficiency in CAD software (e.g., AutoCAD, MicroStation).
    - Strong attention to detail and accuracy.
  - Qualifications:
    - Diploma or certificate in CAD drafting or related field.
    - Proficiency in CAD software (e.g., AutoCAD, MicroStation).
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- Strong attention to detail and accuracy.

## ***12. Designation: Quantity Surveyors***

Responsibilities:

- Prepare quantity take-offs and cost estimates for construction projects.
- Analyze project plans and specifications to identify materials, labor, and equipment requirements.
- Obtain and evaluate quotations and bids from suppliers and subcontractors.
- Monitor project costs and expenditures, tracking variations and adjustments.
- Prepare progress payments and final accounts for contractors and consultants.
- Experience:
  - Diploma or degree in Quantity Surveying, Civil Engineering, or a related field.
  - 2-5 years of experience as a quantity surveyor or estimator in construction projects.
  - Proficiency in quantity surveying software and cost estimating tools.
  - Strong analytical and numerical skills.
- Qualifications:
  - Diploma or degree in Quantity Surveying, Civil Engineering, or a related field.
  - Proficiency in quantity surveying software and cost estimating tools.
  - Strong analytical and numerical skills.

## ***13. Designation: Field Surveyors***

Responsibilities:

- Conduct topographic surveys, boundary surveys, and construction surveys for infrastructure projects.
  - Operate surveying instruments, such as total stations, GPS receivers, and levels, to collect field data.
  - Process and analyze survey data using surveying software and geographic information systems (GIS).
  - Prepare survey plans, maps, and reports to support project design and construction activities.
  - Assist engineers and designers in interpreting survey data and integrating it into project plans and specifications.
  - Experience:
    - Diploma or certificate in Surveying, Civil Engineering, or a related field.
    - 2-5 years of experience as a field surveyor in infrastructure projects.
    - Proficiency in surveying instruments and techniques.
    - Familiarity with surveying software and GIS tools.
  - Qualifications:
    - Diploma or certificate in Surveying, Civil Engineering, or a related field.
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- Proficiency in surveying instruments and techniques.
- Familiarity with surveying software and GIS tools.

#### ***14. Designation: Computer Operators***

Responsibilities:

- Operate and maintain computer systems and peripherals for engineering and administrative tasks.
- Perform data entry, processing, and management tasks using office software applications.
- Assist engineers and project managers in organizing and maintaining project documentation.
- Coordinate with IT staff to troubleshoot technical issues and ensure smooth operation of computer systems.
- Provide technical support and training to staff on computer applications and systems.
- Experience:
- Diploma or certificate in Computer Science, Information Technology, or a related field.
- 2-5 years of experience as a computer operator or IT support technician.
- Proficiency in office software applications (e.g., Microsoft Office, Adobe Acrobat).
- Strong problem-solving and communication skills.
- Qualifications:
- Diploma or certificate in Computer Science, Information Technology, or a related field.
- Proficiency in office software applications (e.g., Microsoft Office, Adobe Acrobat).
- Strong problem-solving and communication skills.

#### ***15. Designation: Resident Engineer (Site Supervision)***

Responsibilities:

- Provide on-site technical leadership and oversight for construction activities, ensuring compliance with design specifications, quality standards, and safety requirements.
  - Manage and coordinate construction activities, including earthworks, concrete works, and structural installations, to ensure timely and efficient project delivery.
  - Supervise and direct site staff, including engineers, technicians, and laborers, to ensure that work is performed safely, accurately, and in accordance with project plans and specifications.
  - Conduct regular site inspections and quality control checks to monitor construction progress, identify issues or deviations from the design, and implement corrective actions as needed.
  - Review and approve contractor submittals, including shop drawings, material samples, and method statements, to ensure compliance with project requirements and specifications.
  - Coordinate with project stakeholders, including government agencies, contractors, and consultants, to resolve technical issues, address concerns, and facilitate project progress.
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- Prepare progress reports, construction documentation, and other project deliverables for review and approval by project management and funding agencies.
- Ensure compliance with environmental and social safeguards requirements, as well as health and safety regulations, throughout the construction process.
- Provide technical support and guidance to project staff and stakeholders, including training and capacity building activities to enhance construction management skills and knowledge transfer.
- Experience:
- Bachelor's or Master's degree in Civil Engineering, Construction Management, or a related field.
- 10 years of experience in construction management and site supervision, preferably in the context of projects similar to ones stated in TOR
- Strong technical background in civil engineering, with expertise in structural design, hydraulic engineering, and construction materials and methods.
- Demonstrated experience in managing construction teams and coordinating with diverse stakeholders.
- Familiarity with environmental and social safeguards policies and requirements, as well as project management principles and practices.
- Qualifications:
- Bachelor's or Master's degree in Civil Engineering, Construction Management, or a related field.
- Excellent leadership, communication, and interpersonal skills.
- Proficiency in project management software and Microsoft Office applications.
- Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.

### ***16. Designation: Material Engineer (Site Supervision)***

#### Responsibilities:

- Manage materials procurement, testing, and quality control activities for construction projects, ensuring compliance with design specifications and industry standards.
  - Conduct material testing and analysis to assess properties and performance characteristics of construction materials, including aggregates, concrete, asphalt, and steel.
  - Develop material specifications, testing procedures, and quality assurance protocols for construction materials and components.
  - Coordinate with suppliers, contractors, and testing laboratories to ensure timely delivery of materials and accurate testing results.
  - Monitor and inspect materials handling, storage, and installation practices on construction sites to verify compliance with quality standards and specifications.
  - Investigate material-related issues and failures, conducting root cause analysis and implementing corrective actions to prevent recurrence.
  - Prepare material testing reports, documentation, and certification for review and approval by project management and funding agencies.
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- Provide technical support and training to project staff and contractors on material selection, testing, and quality control procedures.
- Experience:
- Bachelor's or Master's degree in Materials Engineering, Civil Engineering, or a related field.
- 5-10 years of experience in materials engineering and quality control, preferably in the context of construction projects.
- Strong technical background in materials science, with expertise in material testing and analysis techniques.
- Demonstrated experience in managing materials procurement, testing, and quality assurance activities.
- Familiarity with construction materials specifications, testing standards, and industry best practices.
- Qualifications:
- Bachelor's or Master's degree in Materials Engineering, Civil Engineering, or a related field.
- Excellent analytical, problem-solving, and communication skills.
- Proficiency in materials testing equipment and software.
- Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.

### ***17. Designation: Site Supervision Engineers***

#### Responsibilities:

- Provide technical supervision and oversight for construction activities on project sites, ensuring compliance with design specifications, quality standards, and safety requirements.
  - Conduct regular site inspections and quality control checks to monitor construction progress, identify issues or deviations from the design, and implement corrective actions as needed.
  - Review and interpret engineering drawings, specifications, and contract documents to ensure accurate implementation of construction plans.
  - Coordinate with contractors, subcontractors, and suppliers to resolve technical issues, address concerns, and facilitate project progress.
  - Assist in the preparation of work schedules, progress reports, and construction documentation for review and approval by project management and funding agencies.
  - Provide technical support and guidance to site staff and contractors, including training and capacity building activities to enhance construction management skills and knowledge transfer.
  - Experience:
  - Bachelor's or Master's degree in Civil Engineering, Construction Management, or a related field.
  - 3-5 years of experience in construction supervision and site management, preferably in the context of infrastructure projects.
  - Strong technical background in civil engineering, with expertise in structural design, construction materials, and construction methods.
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- Demonstrated experience in managing construction teams and coordinating with diverse stakeholders.
- Familiarity with environmental and social safeguards policies and requirements, as well as project management principles and practices.
- Qualifications:
- Bachelor's or Master's degree in Civil Engineering, Construction Management, or a related field.
- Excellent communication, teamwork, and problem-solving skills.
- Proficiency in construction management software and Microsoft Office applications.
- Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.

### ***18. Designation: Site Surveyors***

#### Responsibilities:

- Conduct topographic surveys, boundary surveys, and construction surveys on project sites to support engineering design and construction activities.
  - Operate surveying instruments, such as total stations, GPS receivers, and levels, to collect field data and establish control points.
  - Process and analyze survey data using surveying software and geographic information systems (GIS) to generate accurate survey plans, maps, and reports.
  - Assist engineers and designers in interpreting survey data and integrating it into project plans and specifications.
  - Conduct site inspections and monitoring to verify construction layout, alignment, and grade control.
  - Experience:
  - Diploma or certificate in Surveying, Civil Engineering, or a related field.
  - 2-5 years of experience as a site surveyor in construction projects.
  - Proficiency in surveying instruments and techniques.
  - Familiarity with surveying software and GIS tools.
  - Qualifications:
  - Diploma or certificate in Surveying, Civil Engineering, or a related field.
  - Proficiency in surveying instruments and techniques.
  - Familiarity with surveying software and GIS tools.
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## ***19. Designation: Environmental Engineer/Environmental Compliance Expert***

### Responsibilities:

- Conduct environmental assessments and impact studies for construction projects to identify potential environmental risks and mitigation measures.
- Develop environmental management plans and compliance strategies to ensure project activities comply with environmental regulations and standards.
- Monitor construction activities and implement environmental safeguards to minimize environmental impacts, such as soil erosion, water pollution, and habitat destruction.
- Coordinate with regulatory agencies, environmental consultants, and community stakeholders to obtain permits and approvals for project activities.
- Conduct environmental audits and inspections to assess compliance with environmental requirements and identify areas for improvement.
- Provide technical support and training to project staff and contractors on environmental management practices and procedures.
- Experience:
- Bachelor's or Master's degree in Environmental Engineering, Environmental Science, or a related field.
- 5-10 years of experience in environmental engineering or environmental compliance, preferably in the context of construction projects.
- Strong technical background in environmental assessments, impact studies, and regulatory compliance.
- Demonstrated experience in developing and implementing environmental management plans and strategies.
- Familiarity with environmental regulations and standards, as well as project management principles and practices.
- Qualifications:
- Bachelor's or Master's degree in Environmental Engineering, Environmental Science, or a related field.
- Excellent communication, teamwork, and problem-solving skills.
- Proficiency in environmental assessment tools and software.
- Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.

## ***20. Designation: Sociologist/Social and Community Organizers***

### Responsibilities:

- Conduct social assessments and community consultations to identify social and cultural factors relevant to project planning and implementation.
  - Develop community engagement strategies and participatory approaches to ensure meaningful involvement of stakeholders in project decision-making processes.
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- Facilitate communication and collaboration between project stakeholders, including government agencies, local communities, and civil society organizations.
- Implement social safeguards and mitigation measures to address potential social impacts of project activities, such as resettlement, land acquisition, and livelihood displacement.
- Monitor social impacts and community feedback throughout project implementation, conducting periodic reviews and evaluations to assess project performance.
- Provide technical support and training to project staff and stakeholders on social and community development issues, including gender equality, social inclusion, and cultural sensitivity.
- Experience:
  - Bachelor's or Master's degree in Sociology, Social Work, Anthropology, or a related field.
  - 5-10 years of experience in social and community development, preferably in the context of infrastructure projects.
  - Strong understanding of social and cultural dynamics, with expertise in participatory approaches and community engagement.
  - Demonstrated experience in conducting social assessments, stakeholder consultations, and community mobilization activities.
  - Familiarity with social safeguards policies and requirements, as well as project management principles and practices.
- Qualifications:
  - Bachelor's or Master's degree in Sociology, Social Work, Anthropology, or a related field.
  - Excellent communication, facilitation, and interpersonal skills.
  - Proficiency in participatory methodologies and community engagement techniques.
  - Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.

## ***21. Designation: Legal Expert***

### Responsibilities:

- Provide legal advice and guidance on contractual, regulatory, and compliance issues related to project implementation.
  - Review and analyze project documents, including contracts, agreements, and legal instruments, to ensure compliance with applicable laws and regulations.
  - Draft and negotiate legal agreements, memoranda of understanding, and other legal documents on behalf of project stakeholders.
  - Conduct legal research and analysis to assess legal risks, identify potential liabilities, and propose risk mitigation strategies.
  - Provide legal support and representation in dispute resolution processes, including mediation, arbitration, and litigation.
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- Coordinate with external legal counsel, regulatory authorities, and government agencies to address legal issues and concerns.
- Prepare legal opinions, reports, and documentation for review and approval by project management and funding agencies.
- Experience:
- Bachelor's or Master's degree in Law, Legal Studies, or a related field.
- 5-10 years of experience as a legal advisor or consultant, preferably in the context of infrastructure projects.
- Strong understanding of contract law, administrative law, and regulatory compliance.
- Demonstrated experience in drafting legal documents, negotiating agreements, and providing legal counsel to project stakeholders.
- Familiarity with international legal frameworks, as well as project management principles and practices.
- Qualifications:
- Bachelor's or Master's degree in Law, Legal Studies, or a related field.
- Excellent analytical, problem-solving, and communication skills.
- Proficiency in legal research and drafting.
- Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.

## ***22. Designation: IT Specialist***

### Responsibilities:

- Manage and support information technology systems and infrastructure for project implementation and management.
  - Configure, install, and maintain hardware and software components, including servers, workstations, and networking equipment.
  - Provide technical support and troubleshooting for computer systems, software applications, and IT-related issues.
  - Implement and maintain data management systems and databases for project documentation, reporting, and information sharing.
  - Develop and implement IT security policies and procedures to protect project data and information assets from unauthorized access, disclosure, or loss.
  - Coordinate with IT vendors, consultants, and service providers to procure and implement IT solutions and services.
  - Provide training and capacity building to project staff and stakeholders on IT systems, applications, and best practices.
  - Experience:
  - Bachelor's or Master's degree in Information Technology, Computer Science, or a related field.
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- 5-10 years of experience in IT systems administration and support, preferably in the context of infrastructure projects.
- Strong technical background in hardware, software, networking, and cybersecurity.
- Demonstrated experience in managing IT systems and infrastructure in complex organizational environments.
- Familiarity with project management principles and practices.
- Qualifications:
  - Bachelor's or Master's degree in Information Technology, Computer Science, or a related field.
  - Strong technical skills in IT systems administration and support.
  - Excellent communication and problem-solving skills.
  - Fluency in English required; proficiency in other languages, particularly those commonly spoken in project countries, is advantageous.

#### **6. Consultants Office**

The Consultant shall establish main office in Quetta in close proximity (walking distance) from the CLIENT office. Similarly, the consultant shall have to establish field office near the site.

#### **7. Facilities from the Client**

The Client will facilitate the Consultants to obtain all reports, maps, data, or any other information relevant to the project and available with provincial Irrigation Department or other line departments. The Client will also provide the Consultants with all permissions and approvals needed by the Consultants to obtain (if available) maps, aerial photographs, remote sensing data and images, or to import into Pakistan equipment and supplies needed to enable the consultants to carry out the Tasks relevant to the assignment. The Client will assist the Consultants and each of its personnel with work permits and such other documents as shall be necessary to enable them to perform their services; and also assist in issuance of entry and exit visas, residence permits, and other necessary documents for the expatriate employees of the Consultants and their eligible dependents, required for their stay in Pakistan. Any duties, fees or other port charges on staff or equipment shall not be reimbursable by Client.

Equipment, computers, instruments and furniture etc required by the Consultants under the Consultancy Services shall be returned to Irrigation Department.

#### **8. Other Expenditure Details**

<b>S.No</b>	<b>Description</b>	<b>Requirement</b>
1	Rent and POL/ maintenance/ repair (4 x 4 Wheel Drive) +POL+ driver (10 Nrs)	(10X48) = 480 months
2	Rental Office Building (01 Nr)	48 months
3	Stationary, Photostat and Utilities Charges (LS)	Lump sum
4	Purchase of office equipment, computers, laptop, printers, digital cameras (Drone and Digital) and office furniture etc (LS)	Lump sum

### **Qualification of Consultants:**

The selection criteria and requirements are:

1. Corporate capacity for offering similar services (Core business) for Ten (10) years.
2. At least five (5) similar assignments completed/under taken in the last ~~ten~~five years indicating the nature and scope of these assignments in areas of design, supervision, procurement, contract administration, quality assurance, environment, management planning, implementation of resettlement action plan,
3. The firm should provide details including documentary evidences regarding contract awards, reference letters, undertaken projects completion/ongoing progresse~~completion certificates~~ from the clients along with postal address and client contact numbers, stating the scope of services and deliverables of projects completed/under taken in the last ~~Ten~~five (10~~5~~) years,
4. In the case of a Joint Venture (JV), the details of such projects will be provided separately for the primary or associated consultant,
5. Details of the logistic capacity of the firm including general availability of technically qualified staff.

### **Selection Process:**

A consulting firm will be selected in accordance with Quality and Cost Based Selection (QCBS) method set out in the World Bank's Procurement Regulations (Nov 2020) [www.worldbank.org/procure](http://www.worldbank.org/procure).

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**ANNEX-I**

<b>Sr No</b>	<b>Description</b>	<b>District</b>
<b><u>Mekran Irrigation Zone</u></b>		
<b>Package-I</b>		
1	Barit Pirandar Dam	Awaran
2	Sairh Protection Bund. Jhao, Awaran	Awaran
3	Awaran Bazar, Awaran	Awaran
4	Sawar Kaur Dam	Gwadar
5	Roomrao Dam	Gwadar
6	Merani Dam	Kech
<b>Package-II</b>		
1	Thrara Flood Protection Bund	Lasbela
2	Gagoo Flood Protection Bund	Lasbela
3	Restoration of Flood Protection Embankment U/S of Nurg Hingri Weir (Shurli & Faizo Bund)	Lasbela
<b>Package-III</b>		
1	Daroo wala Flood Protection Structure	Lasbela
2	Restoration of Lasbella Canal	Hub
3	Sohar Gath Dam	Hub
4	Drazi Flood Protection Bund	Hub
<b><u>Canal Irrigation Zone</u></b>		
<b>Package-IV</b>		
1	Restoration / Strengthening of flood embankment of Main Rabi Canal from RD.0 to RD.100 and Rabi Canal -II from RD.0 to 22 km District Naseerabad	Naseerabad
2	Restoration / Strengthening of flood embankment of Patfeeder Canal from RD.455 to RD.505 & RD-558 to 621 District Naseerabad.	Naseerabad
3	Rehabilitation of Main Drains i-e Naseer, Judair, Temple, Jhal Pat, Mohabat, Ballan, Rupa, Umrani and Magsi drains in District Naseerabad and Jaffarabad	Naseerabad & Jaffarabad
<b>Package-V</b>		
1	Construction of Syphon at RD.70 and 4 Nos VRBs at different reaches of Uch Canal District Sohbat Pur	Sohbat pur

2	Flood Protection Bund for sohbatpur Town	Sohbat pur
3	Restoration / Strengthening of embankment of Hairdin Main Drain from RD.0 to RD.62 and Construction of 3 Nos VRB at Different Places District Sohbat Pur	Sohbat pur
	<b>Package-VI</b>	
1	Construction of flood Protection Bund for Dera Allah Yar Town and re-alignment of Jhat Pat main Drain from City area District Jaffarabad	Jaffarabad
2	Restoration of Damages to Escape Channel & Akbar Minor alongwith structures District Jhal Magsi	Jhal Magsi
3	reconstruction of flood protection band near Zain ul abideen Khan Khos	Sohbat pur
4	Restoration of Flood Protection Bund Gandawah Town left and Right Side District Jhal Magsi	Jhal Magsi
	<b><u>Quetta Irrigation Zone</u></b>	
	<b>Package-VII</b>	
1	Rabat Dam	Duki
2	Zarkhail Delay Action Dam Sharaghg Area	Harnai
3	Walla Delay Action Dam Zarghoon Ghar Area	Harnai
4	Khazeena Dam	Musakhel
5	Gargoji perennial irrigation scheme	Musakhel
	<b>Package-VIII</b>	
1	Flood Protection along Nari River at Ghulam Bolak Area Sibi	Sibi
2	Khumbri Dam	Kachhi
3	Sibri Dam	Kachhi
4	Qamber Dam	Kachhi
	<b>Package-IX</b>	
1	Toiwer Batozai FIS	Killa Saifullah
2	Akhtar Nikah Dam	Killa Saifullah
	<b>Package-X0</b>	
1	Mako Kach Dam	Killa Abdullah
2	Rehabilitation of Sanzala Karez (Tehsil Huramzai), Zaida Dam i/c check dams & flood protection in Sharan (Tehsil Nana Sahib)	Pishin
	<b>Package-XI</b>	
1	Mazoo Dam	Ziarat
2	Zandra Tangi Gravity Dam	Ziarat
3	Peechi Dam	Ziarat
4	Kaddi kach Dam	Ziarat
	<b><u>Khuzdar Irrigation Zone</u></b>	



	<b>Package-XII</b>	
1	Laghamgir Dam	Kalat
2	Sarawan Irrigation Scheme	Kalat
3	Padmaran Dam	Kalat
4	Lohi Dam & conveyence system Restoration	Khuzdar
5	Zawa Irrigation Scheme	Khuzdar
6	Thal Dam	Mastung
7	Splinji-I Dam	Mastung
	<b>Package-XIII</b>	
1	Flood Protection Bunds in Zahrazai Bolak & Mangochar Khaliqabad Pandran Makiki	Kalat
2	Flood Protection Bunds in Gazag Area Khaliqabad and Johan Shakhree Khaliqabad	Kalat
	<b>Package-XIV</b>	
1	Restoration of Baddo Perennial Irrigation Scheme	Kharan
2	Garuk Perennial Irrigation Scheme	Kharan
3	Gatamon Storage Dam	chagai
4	Azdaghol Dam	Nushki
5	Zaik Perennial Irrigation Scheme	Washuk
6	Plantak Dam	Washuk