

Terms of Reference

of

DESIGN, SUPERVISION AND CONTRACT MANAGEMENT CONSULTANT (DSC-07)

for

- a) Detailed Engineering Survey and Design of Service Reservoir at Balaju under; Kathmandu Valley Water Supply Improvement Project (KVWSIP)- AF, Loan 3255- NEP
- b) Design Review, Construction Supervision and Contract Management of works under Project 34304-045(*proposed loan*)¹
- c) Construction Supervision and Contract Management of the remaining works under Loan 2776 and Loan 3255

1. Background

The Government of Nepal has applied for financing from the Asian Development Bank (ADB) towards the cost of the Second Kathmandu Valley Water Supply Improvement Project (SKVWSIP). This consulting services package shall be partly financed from the approved Loan-3255 and partly from the proposed loan, which is yet to be signed.

The proposed financing of the SKVWSIP will support the on-going efforts of the Government of Nepal (the Government) towards improving the water supply services in the Kathmandu Valley by developing a reliable, equitable, and sustainable water supply system. The Project will invest in the augmentation of the existing bulk water transmission capacity by laying additional pipeline from Sundarijal to Chabahil, expansion of distribution network improvement (DNI) in areas inside and outside the Ring Road and augmentation of water storage capacity in the Kathmandu Valley. The project will complement the past and the on-going Asian Development Bank (ADB)-supported investments under Loans 1820, 2776, and 3255. The resultant work outputs are expected to lead to enhanced efficiency in service delivery, and higher impact on health and the quality of life of the inhabitants of the municipalities of the Valley.

The major infrastructure works, completed and on-going, under the past and on-going loans are the construction of a 26 km water diversion tunnel (with an ultimate carrying capacity of 510 MLD) to transfer 170 MLD of water to the Kathmandu Valley from the Melamchi River in the first phase, a water treatment plant constructed in two phases with a total treatment capacity of 170 MLD at Sundarijal, 77 km of bulk distribution system (BDS) pipelines, 10 new water service reservoir tanks (SRTs) with a total capacity of 74,500 cum, 1,037 km of distribution network improvement (DNI), and 120 km of road reinstatement works.

It is expected that a separate proposed project, the Melamchi Water Supply Project (Phase 2) (MWSDP-2) will be implemented by the Melamchi Water Supply Development Board. This project would augment water supply through the Melamchi tunnel from 170 to 510 MLD with 2 additional tunnels of total 11 km (9 km from Yangri River to Melamchi River; and 2 km from Larke River to Yangri River) and increase the water treatment capacity at Sundarijal from 170 MLD to 510 MLD.

The major infrastructure works under the Second Kathmandu Valley Water Supply Improvement Project (SKVWSIP) funded under the proposed loan are the construction of (i) a second 11 km BDS pipeline from Sundarijal to Chabahil (BDS-05) to augment the present transmission line capacity from 222.5 MLD to 510 MLD, (ii) three SRTs (with 6,000 m³ capacity at Kirtipur, 8,500 m³ capacity at Mahankalchaur and 11,000 m³ - 18,000 m³ capacity at old Balaju Reservoir, and (iii) approximately 390 km of distribution

¹ Loan number will be allocated upon project approval.

network improvement (DNI) (*DNI 7B and 7C*) using horizontal directional drilling (HDD) technology for some stretches and including associated road or pavement surface reinstatement works where HDD will not be used.

MWSDB under the Ministry of Water Supply (MWS) is responsible to implement the construction of water diversion infrastructure and water treatment facilities, and the Project Implementation Directorate (PID) under the Board of Directors of the Kathmandu Upatyaka Khanepani Limited (KUKL) is responsible to implement the construction of BDS, SRTs and DNI works within the Valley.

PID has engaged, in the past, a number of international consulting firms in succession as the design and supervision consultants (DSC) for various durations to provide services with professional support to survey, investigate and design BDS and DNIs, prepare bidding documents, procure works and to supervise and manage the construction of BDS, SRTs and DNI improvement works. In addition to the DSCs, the PID has engaged a Community Awareness and Social Safeguards Consultant (CASSC), which is tasked with building community participation and ownership of PID projects, including undertaking social mobilization, managing mass media relations, conducting public awareness campaigns and ensuring compliance with the Gender Equality and Social Inclusion Action Plan (GESI), and safeguards monitoring.

PID now intends to engage another international consulting firm, as a Design and Supervision Consultant (DSC-07), in accordance with the Quality-and-Cost-Based Selection (QCBS) procedure as set out in ADB's Guidelines on the Use of Consultants (2013, as amended from time to time) to provide its services for the survey, investigation, design and construction supervision of additional BDS, SRTs and DNI works as outlined in the Scope of Services of the TOR. The DSC-07 will take over the supervision and management of on-going construction works and related records, papers, documents and reports from the predecessor, Design and Supervision Consultant (DSC-05), currently on board, and to carry out new assignments, as outlined in the scope of work, which includes mostly construction supervision and management of the construction works. The DSC-07 will also be required to systematically handover the supervision and management of unfinished works and related records, papers, documents, data and reports in its possession to the successor DSC, if employed later.²

Approximately, a total of 592 person-months of consulting services (84 person-months international and 508 person-months national) have been estimated under this consultancy services package. The assignment is expected to commence from *October 2019* for a period of 42 months. The DSC-07 will report to and work under the overall guidance and supervision of the Project Director (PD) and/or any other officials as assigned by him or her from time to time.

2. Objective

The objective of the consulting services is to provide professional services of design and supervision engineers, environmental experts, social development experts, contract management experts and other technical experts relevant to the assignment (e.g. commissioning, SCADA, horizontal directional drilling (HDD), etc.) and proactively provide professional inputs and advice to the PD and other PID officials in pre-construction, construction and post-construction phases of the subprojects by ensuring technically sound designs, high quality of construction, health and safety, and environmental management to international standards, and transparent project implementation.

The specific objectives of the consultancy services are the review and update of the existing designs and documents for SRTs at Kirtipur and Mahankal Chaur; carrying out detailed engineering surveys, investigations and designs of SRTs at old KUKL Balaju reservoir site, preparing safeguard documents and assisting in procurement; and comprehensive contract supervision and contract management of all the contracts during construction and post-construction periods as outlined in the TOR. The DSC-07 also needs to ensure that the implementation of the construction works are in accordance with the

² Files should be provided in editable format (and not only pdf) wherever applicable.

environment and social safeguard requirements of the Government and ADB (including health and safety), which will involve intensive field supervision and interaction with contractors.

3. The Scope of Services

The detailed scope of services to be provided by the Design and Supervision Consultant (DSC-07), referred below as the Consultant, has been outlined as below. However, the outlined services as below are not an exhaustive list but are indicative only. The Consultant is expected to perform professionally and undertake activities necessary to achieve the objectives of the Project. The broad outline of the scope of services shall be, but not limited to the following:

Task A: Detailed Design, Safeguards and Bidding Documents for SRTs at old KUKL Balaju Reservoir site and updates of the documents for SRTs at Kirtipur, Mahankal Chaur

- (i) Carry out detailed engineering surveys, geotechnical investigation and detailed design of Service Reservoir Tank(s) (SRTs) at old KUKL Balaju Reservoir site (at least 11,000 cum to 18,000 cum capacity according to the land availability), including preparation of technical specification, tender drawings, cost estimates, bidding documents, and safeguard documents (IEE, EMP, RP/DDR);
- (ii) Review the detailed design of Service Reservoir Tanks (SRTs) at Kirtipur site (with 6000 cum capacity) and Mahankal Chaur site (8500 cum capacity) and update the designs including technical specification, tender drawings, cost estimates, bidding documents, and safeguard documents (IEE, EMP, RP/DDR) as necessary;

Task B: Construction supervision and management of on-going contract packages (BDS-05, SRTs at Kirtipur, Mahankal Chaur and old KUKL Balaju SRT, DNI-7A, DNI-7B and DNI-7C, Integration Package and Road Reinstatement Works, KUKL/DNI-9a-1/Kapan³ and remaining construction works of 4 BDS and 3 DNI-Packages under Loan – 2776 and Loan -3255)

- (i) Carry out construction supervision and contract management, including assistance during defects liability periods (DLP) of the construction work of about 11 km of bulk distribution system (BDS-05/Package-5) from Sundarijal to Chabahil Chowk including three SRTs (with 6,000 cum capacity at Kirtipur and 8,500 cum capacity at Mahankal Chaur; and 11,000 cum - 18,000 cum capacity at old Balaju Reservoir under the proposed new loan; It is assumed that the contract for these packages will be awarded after DSC-07 is on board and the work remaining would be 100%;
- (ii) Carry out construction supervision and contract management, including assistance in DLP of the on-going construction works of DNI-7A (Package-4) under Loan – 3255. It is assumed that the 50% construction work has been completed and the remaining work would be 50%;
- (iii) Carry out construction supervision and management, including assistance in DLP of the on-going construction works of DNI-7B/Package-5 (Swayambhu, Bafal, Soltimod and other area under this package partly with HDD technology) under the proposed Loan. It is expected that the contractor will have mobilized but not yet commenced work;
- (iv) Carry out construction supervision and contract management of the on-going construction works of DNI-7C/Package-6 (Bishal Nagar, Maharajgunj, Dhumbarahi, eastern part of Chabahil-Gaushala road and other areas under this package partly with HDD technology) under the new project; It is expected that the contractor will have mobilized but not yet commenced work;
- (v) Carry out construction supervision and contract management of the remaining construction works of 4 BDS and 3 DNI-Packages under Loan – 2776 and Loan -3255 particularly commissioning of some BDS and the entire DNI system and road reinstatement works; It is expected that the work will be approximately 90% complete with 10% of works remaining;
- (vi) Carry out construction supervision and contract management of the remaining construction works of Integration Packages under Loan -3255; It is expected that the work will be approximately 20% complete with 80% remaining; and
- (vii) Carry out construction supervision and contract management of the on-going construction works of KUKL/DNI-9a-1/Kapan under Government financing. It is expected that the work will be approximately 20% complete with 80% remaining.

³ This package is financed by the Government and not by ADB.

All progress rates provided by package above are indicative and not binding.

Task C: On-going supervision and management of SCADA contract

- (i) Carry out supervision and management of the on-going contract package for “Management of New Water Network of the Kathmandu Valley Using Valves, Actuators with Supervisory Control and Data Acquisition (SCADA)” under Loan – 3255; and
- (ii) Ensure that the designs and construction of all on-going and new BDS and DNI works are compatible with the SCADA management of distribution network system and align the operation of the BDS and DNI works with the existing software and hardware of the SCADA management system developed through the on-going contract (“Management of New Water Network of the Kathmandu Valley Using Valves, Actuators with SCADA”) under Loan – 3255. It is expected that this assignment will be approximately 10% complete with 90% remaining.

Task D: Other Project Implementation Support

- (i) Provide support to PD/PID in the Project management, Project performance monitoring and Project administration to successfully implement the Project and contribute to achieving the stated Project objectives and outputs;
- (ii) Ensure that Contractors implement the environmental and social safeguard requirements and compliance at all stages of Project. This includes site-specific environmental management plans (SEMPs), occupational health and safety (OHS) measures, gender equality and social inclusion (GESI) action plan, resettlement plans (RPs) and the community awareness and participation plan (CAPP);
- (iii) Provide support to PD/PID in reducing public grievances against the Project due to poor environmental compliance by contractors, poor planning, or delays in the execution of works;
- (iv) Update Base Maps (CAD and GIS), Manuals, Guidelines and Plans for the commissioning of on-going and new construction of BDS and DNI works under Loan, Loan – 3255 and the proposed Loan;
- (v) Provide support to KUKL/PID in commissioning and operationalizing the entire water supply system; and
- (vi) Provide data management support to KUKL/PID with the use of a well-developed and efficient management information system;
- (vii) Prepare Monthly and Quarterly Progress Reports (M/QPR) and other reports as spelled out in the Reporting Requirement for submission to KUKL, MWS, KVWSMB, ADB and other agencies

4. Description of Services

4.A Surveys, Studies and Investigations and Detailed Engineering Designs

- (i) Review the earlier plans and reports on the water supply system and those underway, most notably the Second Capital Investment and Asset Management Plan (CIAMP-2), to ensure that the infrastructure and assets developed under the current project are aligned with water supply master plans and to base the designs following the recommended principles, guidelines, criteria and standards;
- (ii) Review other available secondary data and reports and identify requirements of surveys, studies and investigations;
- (iii) Carry out all the required engineering surveys and investigations such as total station survey, geotechnical investigation, soil survey, leak detection survey, construction material survey, ground water investigation (i.e. hydro-geological investigations), rainfall data collection, identification of underground utilities and their mapping, water sampling and analysis;
- (iv) Carry out survey and design of the newly built BDS line to be connected with the proposed SRT to be constructed at old Balaju Reservoir site;

- (v) Consider all the future outlet expansions from new SRTs to be constructed while designing the new SRT(s) at old KUKL Balaju reservoir site as well as at Kirtipur and Mahankal Chaur reservoir sites;
- (vi) Carry out detailed design, including preparation of drawings, specifications, cost estimates, etc., and bidding documents for the service reservoir at old Balaju Reservoir site, including structural drawings, bar-bending schedules etc. as appropriate; and
- (vii) The designs should be carried out applying nationally approved design criteria, design rules and service levels, and ensure that all designs comply with seismic resistance requirements. Whenever any relevant criteria, rules and service levels are not available in Nepal, DSC-07 should refer to those approved by PID for application in previous designs. If any of the existing criteria, rules and service levels are not adequate or deemed not appropriate in a specific situation, those used in other developing countries may be adopted with adequate justification. Any adopted criteria, rules and service levels that are not nationally approved must be approved by PID and applied on an interim basis. Such approval should be documented and properly recorded for future reference.

4.B Review of Design and Necessary Updates and Procurement Assistance

4. B.1 Review of Design, Preparation and Update of Base Maps, Manuals, Guidelines and Commissioning Plans

- (i) Review existing designs prepared by earlier consultants and make any necessary updates to improve quality or adapt to new conditions if required during implementation;
- (ii) Prepare/update Base Maps (CAD and GIS) of water supply infrastructure under the scope of services;
- (iii) Prepare the project Quality Assurance and Quality Control (QA&QC) Manual, delineating a consistent, comprehensive and uniform QA &QC system for the packages, including but not limited to systems of checks and reviews, description of type, frequency and procedures of on-site as well as laboratory tests and inspections, etc., that will be enforced during design and construction to ensure highest standards of quality;
- (iv) Update the PID's Occupational Health and Safety Manual as needed for the works and enforce implementation on each construction site to ensure safety of construction workers, engineers, and the public;
- (v) Update the Contract Administration Manual for the project delineating procedures and assigning responsibilities at various competent levels for day-to-day contract management requirements, such as measurement of works, certification and payment of contractors' bills, release of retention money, approval of variations, time extension, procedure for settling contractors' claims, issuance of completion certificates, financial closure of contracts, management during DLP, etc., and to use it in administration of contracts;
- (vi) Update, using an appropriate computer software (MS Projects or Prima Vera, etc.), a standard Construction Management System to be followed by contractors at construction sites comprising of important components such as planning of activities (work plan), procurement of construction material and equipment, construction methodology, deployment of construction machinery, deployment of workers, flow of funds, etc., and enforce use of such a system by the contractors;
- (vii) Prepare user-friendly operations and maintenance (O&M) manuals of various systems and components, developed under the project, for KUKL's use after the assets are handed over to KUKL, and provide training to KUKL staff members on the use of these manuals, as appropriate;
- (viii) Circulate the prepared manuals and guidelines among the relevant stakeholders, including contractors' workers, and organize training workshops in a timely manner to ensure their proper and effective use for improving the quality of implementation;
- (ix) Prepare details for disconnection and interconnection of the existing water supply pipelines and commissioning plan of new distribution systems on district metering area (DMA) basis within DNI packages including preparation of an operations plan;
- (x) Provide support to PID and KUKL during commissioning and operations of the entire system to ensure that the system functions smoothly and stabilizes;

- (xi) Review and update guidelines for the assessment of non-revenue water (NRW) during testing and commission of the DNI works and develop NRW Reduction Strategies based on the outcomes of the assessment and ensure the implementation of such strategies; and
- (xii) Provide support including necessary training to PID, KVWSMB and KUKL staff in handing over of the assets created under the projects implemented by PID.

4. B.2 Update Bidding Documents for BDS and DNI Packages

- (i) Review the earlier prepared detailed engineering designs, bidding documents and all necessary tender drawings, technical specifications, bill of quantities (BOQ), detailed cost estimates, implementation schedules, etc. for BDS-05 and SRT packages and update as needed to ensure readiness for the new bidding processes. In addition to traditional pipe laying with the open trench method, the consultant shall review the designs with Horizontal Directional Drilling (HDD) method using trenchless technology and update as necessary. The technical specifications should be in accordance with best international practice and should be prepared to achieve the highest standards of quality of works and workmanship. The detailed cost estimates should be prepared in accordance to the Public Works Directives of the government;
- (ii) Cross-check safeguards documents with bidding documents to ensure that EMPs, OHS measures and other mitigation measures have the necessary specifications, cost estimates, BOQ items etc. as relevant;
- (iii) Prepare new bidding documents, if any, and assist PID in issuing bid invitation, addendum/corrigendum, and clarifications to the bidders' queries, receiving of bids and evaluation, award of contract and signing of contract. Preparation of bidding documents and bidding procedures followed should comply with the relevant government laws, rules and directives and relevant ADB guidelines; and
- (iv) Prepare construction drawings with sufficient details to permit contractors to carry out construction work effectively and unambiguously and with highest standards of quality of works and workmanship.

4. B.3 Social, Environmental, Archaeological, Occupational Health and Safety, Community Participation, Gender Issues and Information Dissemination

Environmental Management

- (i) Review and update the Initial Environmental Examinations (IEE) already prepared for the project; carry out disclosure as necessary after the detailed designs;
- (ii) Prepare the IEEs with EMPs for the SRTs at old KUKL Balaju Reservoir site and update IEEs with EMPs for the SRTs at Kirtipur site and Mahankal Chaur site and any other new IEEs with EMPs identified during project implementation;
- (iii) Assist PID in obtaining all necessary permissions and complying with statutory requirements as required prior to construction, such as permissions from Department of Archaeology, Department of Forests and National Parks, and for road permits, and tree-cutting, etc.;
- (iv) Ensure that all bidding documents and contract documents contain the Environmental Management Plan (EMP) and specifications/cost estimates/BOQ items for mitigation measures are included as relevant;
- (v) Ensure preparation and review quality of the contractors' site-specific EMPs (SEMPs);
- (vi) In compliance with the EMP, develop a strategy to overcome the difficulties of construction/traffic/pedestrian management in narrow streets and also prepare detailed plans for safe detours of traffic and pedestrians during excavation for pipe laying. This should include proper signage to communicate with road and sidewalk users. Propose and implement mechanism for coordination among all stakeholders such as traffic police, roads department, user committees, etc., for smooth construction execution.
- (vii) Monitor compliance of EMP and/or environmental mitigation action plan as well as any other environmental issues in coordination with PID and other stakeholders;
- (viii) Provide trainings to contractors' staff and PID personnel for environmental management and monitoring during construction and

- (ix) Assist PID in preparing and submitting semi-annual environmental monitoring reports (SEMRs) to ADB per ADB reporting requirements.

Cultural heritage and archaeology

- (x) Adequate special measures will be taken for working near buildings and structures of cultural significance and in heritage zones involving close coordination with the Department of Archaeology and UNESCO. Ensure that contractors are trained and aware of chance finds procedures for archaeological remains;
- (xi) Review whether any of the construction sites pass through heritage areas and if so prepare Archaeological Evaluations/Heritage Impact Assessments, or other agreed document to be approved by the Department of Archaeology (DOA) and ADB for the sections that are classified as archaeologically or historically sensitive;
- (xii) Ensure that all bidding documents contain specific measures for working and excavating in archaeologically sensitive areas;
- (xiii) Monitor, supervise, and advise construction contractors on avoiding impacts to archaeologically sensitive areas in coordination with the Department of Archaeology and take remedial actions, when necessary; and
- (xiv) Conduct trainings for contractors and PID in the application of archaeological protocols and good excavation techniques.

Occupational Health and Safety (OHS)

- (xv) Review the PID OHS manual and update as needed;
- (xvi) As part of the EMP, prepare a project focused Occupational Health and Safety Plan to be adopted by PID, DSC and contractors on project work sites;
- (xvii) Assist PID to develop standards, specifications and protocols for OHS as requested;
- (xviii) Review bidding documents to ensure that OHS specifications are adequate and measures are included with costs in provisional sums and BOQ items;
- (xix) Review Contractor method statements for OHS procedures; and
- (xx) Monitor OHS implementation in the field, train relevant consultants and contractor staff, and recommend corrective actions to PID for non-compliance.

Resettlement, Grievance Redress and Other Social Issues

- (xxi) Review and update the Resettlement Plans (RP) already prepared for the project based on detailed designs and in accordance with the resettlement framework (RF) and facilitate the approval and disclosure of the updated RP by the PMU and ADB;
- (xxii) Work closely with contractors to identify roads which will require full closure and conduct income surveys of potentially affected businesses and other affected persons;
- (xxiii) Identify any further resettlement requirements and costs that may be required, including for accidental damages that occur during construction;
- (xxiv) Provide all information required in relation to restriction of right-of-way access, relocation of existing utilities, and other obstructions at the proposed work sites including vendor stalls;
- (xxv) Monitor compliance of Resettlement Plan or any other social issue identified during project implementation;
- (xxvi) Undertake consultations with communities and *To/le* (neighborhood) committees ensuring inclusion and coverage of all sections of society, including local leaders, civil society, women and the poor, prior to design finalization and during implementation;
- (xxvii) Assist PID in addressing community complaints and grievances according to the project Grievance Redress Mechanism (GRM) – the CASSC consultant will have a lead role in GRM implementation, with supervision and backstopping of the DSC-07; and
- (xxviii) Prepare and submit semi-annual social safeguards monitoring reports (SSMR) to PID per ADB reporting requirements.

Gender and Social Inclusion

- (xxix) Assist PID to supervise implementation of CAPP and gender equality and social inclusion GESI Action Plan, which is led by the CASSC. Provide necessary backstopping and technical inputs, follow necessary processes in effective implementation of CAPP and GESI Plan, its monitoring and reporting; and
- (xxx) Orient and train PID staff to implement and monitor the CAPP and GESI action plan in DNI areas and support in coordination with KUKL's GESI unit;

Training and awareness-raising

- (xxxi) Provide awareness training on OHS, environmental impacts and mitigation measures to contractors' workers, and consultant personnel including PID officials– this training program should include at least one training for each contractor during project kickoff meetings;
- (xxxii) Assist PID and CASSC to orient the contractors on core labor standards in general and gender-related aspects in particular (equal wages, occupational health and safety, water supply and sanitation, etc.) and closely monitor the contractors for compliance;
- (xxxiii) Assist in disseminating information on the project to various stakeholders of the project in initial stage and throughout implementation; and
- (xxxiv) Together with the CASSC, design and implement activities for meaningful consultation, people's participation, awareness generation and public education as detailed out in CAPP.

4. C Construction Supervision and Contract Management

4. C.1 Contract Management

The Consultant's responsibilities in contract management works will include, but not necessarily be limited to the following:

General

- (i) Work as the engineer or employer's representative within the context of conditions of the construction contracts;
- (ii) Review the Contractor's organizational arrangements, key personnel and work plan, construction methods, safeguard plans, materials and their sources;
- (iii) Assist the PID in resolution of contractual issues and overall contract management;
- (iv) Assist PID with the maintenance of consolidated project accounts, and with preparation of financial statements and withdrawal applications for submission to the ADB.

Technical and QA/QC

- (v) Supervision and monitoring of construction works of the project: prepare and check measurements for works completed and in progress, verify and endorse contractor's invoices for payment to the contractor's suppliers, provide certification on the quality of the works accomplished and on their conformity to specifications, drawings and prescribed quality in accordance with specifications, contract documents and quality assurance system;
- (vi) Monitor and enforce, as detailed out in the Quality Assurance and Quality Control (QA & QC) Plan, the quality of inputs, processes, and outputs during all activities of construction to ensure the highest quality of works conforming to the specifications and drawings;
- (vii) Checking the line, level, layout of the construction to ensure conformity with the contract; propose and present for approval any change in the plans that may be deemed necessary indicating any effect the change may have on the contract and prepare all change variation orders;
- (viii) Assess and enforce, as per the Standard Construction Management System, the adequacy of contractors' inputs in terms of material, equipment, construction machinery, workers, and construction approach and methodologies;
- (ix) Monitor and enforce, as detailed in the Health and Safety Manual, the measures taken to ensure safety of the workers, other project personnel, and the general public from the works;

- (x) Furnish detailed drawings, with revisions as necessary, to the contractor; check contractors' designs and drawings;
- (xi) Attend third party inspections if required and provide certification on the quality of the supplies based on such inspections;
- (xii) Provide any other specialized services within the scope of works of this project as may be requested by the PID.

Works Progress

- (xiii) Regularly monitor physical and financial progress against the milestones as per the contract, identify critical issues and provide solutions to ensure completion of contract in time;
- (xiv) Monitor progress of works against baseline work plan and advise on measures to be taken to improve progress and quality;
- (xv) Conduct regular site meetings (at least monthly) with the contractor to discuss issues and problems affecting the progress. Submit monthly meeting minutes to PID and brief the PID accordingly;
- (xvi) Carry out timely reporting to PID for any inconsistency in executing the works and suggesting appropriate corrective measures to be applied.

Resolving Contractual Issues

- (xvii) Examine contractors' requests on claims for time extension, variations, additional compensation and claims and any other matters; interpret the contract conditions diligently on Contractor's detailed submissions and make appropriate recommendations to the PID;
- (xviii) In the event of variations to the works being required, prepare the necessary documents, negotiate these with contractor, determine rates of works; advise the PID on alternatives and recommend these to PID for approval;
- (xix) Recommend and report to the employer regarding any appeal to Dispute Resolution Board, Arbitration or litigation related to the works.

Works Completion

- (xx) Certify completion of part or all of the works and issue the Taking Over Certificate;
- (xxi) Inspect the works at appropriate intervals during the DLP;
- (xxii) After physical completion of contracts, prepare planned maintenance procedures; check installation and commissioning; work as the verifier of the commissioning and performance testing for the DNI and other packages and monitor preparation of the "as built" drawings for various project components;
- (xxiii) At the completion of the works, undertake project monitoring and evaluation in the format acceptable by the PID and assist in preparing a consolidated Project Completion Report in a format to be provided by the ADB.

4. C.2 Construction Supervision

Major responsibilities of the Consultant in Construction Supervision will include, but not necessarily be limited to the following:

Mobilization

- (i) Prepare supervision manual for supervision staff;
- (ii) Approve contractor's quality management plan, work program, method statements, material sources, safeguards, manpower and equipment deployment plan;
- (iii) Conduct training during kickoff meeting for PID safeguard requirements, expectations, and supervision (environment, social, OHS).

Works Execution

- (iv) Supervise and monitor construction of all project components implemented by the PID as specified above and any other components as mutually agreed;
- (v) Ensure at all times the Contractor works in strict compliance with Contractor's quality management plan, work plan, and contract specification, including instructions issued as per contract and non-compliance notification;
- (vi) Provide all necessary setting out data to the civil works contractors and ensuring correctness of the setting out at field;
- (vii) Carry out and recommend necessary adjustments in the design/drawing required during construction as per site requirements;
- (viii) Inspect and supervise the day-to-day operations and activities of contractors to ensure quality of workmanship and compliance with the contract;
- (ix) Supervise the Contractor in all matters concerning health and safety and care of civil works including provision of necessary lights, guardrails, shoring, fencing and security;
- (x) Guide the contractor's personnel and monitor pipe laying works using trenchless technology with Horizontal Directional Drilling (HDD);
- (xi) Approve and / or issue working drawings and issuing instructions to the contractor as required in accordance with the contract specification and Contractor's quality management plan; Measure the completed works and keep detailed records of the measurement;
- (xii) Supervise tests in the field and in laboratory, analyze and justify the results. Undertake independent field and laboratory testing as may be required for verification;
- (xiii) Prepare non-conformity reports and propose any rectification work or other solutions;
- (xiv) Approve interim certificates for progress payments, verify the quantities for such certificates and recommend for payment to the PID;
- (xv) Advise the PID on all matters relating to the execution of the works; assess and provide recommendations to PID on processing the contractor's possible claims and disputes;
- (xvi) Ensure compliance with the environmental and social impact mitigation requirements of civil works contracts, including EMP;
- (xvii) Check and certify as-built drawings for the works prepared by the contractors;
- (xviii) Guide and conduct training to Contractors' personnel in preparation of GIS data including quality and accuracy checking and review of as-built GIS data submitted by the contractors immediately after installation (and ensure data submitted with each IPC) and confirm if data complies with required attributes;
- (xix) Assist the PID to provide on-site training to the concerned field staff on quality assurance and contract administration;
- (xx) Comply with the audit requirements of the Government;

Completion

- (xxi) Inspect the works at appropriate intervals during the DLP;
- (xxii) Carry out final inspections of the works before issuing Defect Liability Certificates;
- (xxiii) Approve the final accounts for contracts and make recommendations for payments.

Records and reporting

- (xxiv) Maintain records, correspondence, detailed diaries, photographs and other documents;
- (xxv) Provide the PID with complete records, and inception, monthly and completion reports;
- (xxvi) Prepare and issue progress reports for the contracts and projects every month and at the end of every four months in the form acceptable to PID. These reports will include details of the physical and financial status of the contract/project, details of delays and consequences if any, comments and solution on the quality of works in accordance with the contract. These reports shall also include updated status of all imported items in each contract. The report shall include items imported, items used and items remaining;

4. D Project Management and Monitoring Support

General Project Management

- (i) Prepare a detailed implementation schedule (using MS Project, Primavera or other appropriate scheduling software) and work plan for all activities under the project, covering all stages of implementation from field surveys and investigations to acceptance of finished work. The Consultant should update the schedule and work plan on a monthly basis;
- (ii) Build capacity of the PID on a regular basis in planning and managing the project, and assist the PID on project management, including risk management, cost control, scheduling, monitoring, auditing, reporting, and compliance monitoring for the project required under both the government and ADB rules and guidelines;
- (iii) Provide assistance to the PID finance section in conducting financial accounting and preparing project accounting reports;
- (iv) Assist PID in administering the loan in accordance with ADB's disbursement guidelines and provide trainings to the PID staff for the same;
- (v) Establish systems for smooth and timely funds flow from ADB and government to PID and contractors;
- (vi) Develop and implement procedures for timely payments to the contractors and monitor for compliance;
- (vii) Assist PID in ensuring compliance with all loan covenants during project implementation;
- (viii) Provide support including necessary training to PID, KVWSMB and KUKL staff (including KUKL Branch Managers) in taking over of the assets built under the projects implemented by PID.

Stakeholder Coordination

- (ix) Provide all necessary support to the PID in communicating with and reporting to the Project Steering Committee (PSC), various concerned ministries and government departments as needed, ADB, utility providers and all other relevant stakeholders;
- (x) Assist PID in carrying out all inter-utility management and coordination during the project implementation;
- (xi) Assist PID in conducting regular meetings with all stakeholders, municipalities, KUKL, contractors, MWS, other government entities, etc., to discuss progress and issues related to implementation. The Consultant will prepare meeting minutes for recording and circulation;
- (xii) Plan in advance and assist PID in obtaining, in a timely manner, the required clearances, permits, approvals, sanctions or any other information from relevant competent authorities so that the project activities are not unduly delayed;
- (xiii) Assist PID in establishing a grievance redress mechanism for the project acceptable to ADB.

Monitoring and Reporting

- (xiv) Assist the PID in establishing, as per the project's Design and Monitoring Framework (DMF), and implementing the Project Performance Monitoring System (PPMS) for the project as required in accordance with ADB guidelines and loan agreement for the project. In doing so, the DSC will also carry out any benchmark survey, if not already in place, and subsequent monitoring and evaluation surveys as required;
- (xv) Ensure inclusion of GESI indicators of DMF and GESI action plan in the PPMS and that disaggregated data collection system is in place;
- (xvi) Assist PID in preparing reports for submission to KUKL, MWS, KVWSMB, ADB and other agencies on a quarterly basis or as required for the project. Prepare Quarterly Progress Reports (QPR) in ADB prescribed format within 10 days of each quarter-end;
- (xvii) Establish all necessary records and the procedures of maintaining/updating such records for each package and for the entire project;

4. E. Data and Information Management

Development and Maintenance of a Management Information System (MIS)

- (i) Review the existing data collection, processing system and information safekeeping practices of various KUKL/PID projects;
- (ii) Develop and maintain a computer-based document/action tracking system for the project;
- (iii) Develop a mobile phone-based application ('app') that can be used in real-time monitoring of and reporting for projects;
- (iv) Provide overall assistance in the data basing of project reports, documents, maps and plans, including checklists and reports prepared during monitoring of contractors;
- (v) Assist in the documentation of reports and training/workshops;
- (vi) Maintain the project database system;
- (vii) Maintain MIS equipment;
- (viii) Assist in the preparation of reports and publications with the use of applicable computer-based applications; and
- (ix) Provide assistance to project field offices.

6. Approvals by the Employer

The Consultant will be required to obtain the specific approval of the client before taking any of the following actions that will be specified in General Conditions of Contract including:

- a) Approving the subcontracting of any parts of the Works
- b) Certifying additional cost
- c) Suspension of the Contract
- d) Determining an extension of time
- e) Issuing a variation order in an emergency situation, as reasonably determined by the Engineer;
- f) Fixing rates or prices
- g) Taking any action under a civil works contract designating the Consultant as "Engineer", for which action, pursuant to such civil works contract, the written approval of the Client as "Employer" is required.

Minimum reporting requirements from the DSC is summarized in **Table 1**. All reports should be submitted in 4 hard copies and one soft copy in editable version (e.g. Word, Excel, PowerPoint, AutoCad, etc) and also pdf. See Section 11 for additional requirements for data and reporting.

Table 1: Reporting Schedule

Reports	Timeline	Description
Inception report	Within 45 days after commencement of the services	<ul style="list-style-type: none"> • Detailed work plan and manning schedule • Methodology • Preliminary assessment of the outputs required and action plan on them, including review of existing situation and information
Project Performance Monitoring System (PPMS)	Within 3 months after commencement of the services and every three month regularly	<ul style="list-style-type: none"> • Carry out benchmark survey (if needed) • PPMS prepared per project's DMF
Detailed Design Report and bidding documents for Balaju SRT	Within 4 months after commencement of the services	<ul style="list-style-type: none"> • Geotechnical Reports • Design Report • Specifications, BOQ and Cost Estimates • Safeguard documents (IEE/EMP), RP/DDR
Different Manuals as	First 4 within 3 months	<ul style="list-style-type: none"> • Quality Assurance and Quality Control (QA &

Reports	Timeline	Description
prescribed in the Scope of Services	from the date of commencement and operations and maintenance manuals within 24 months from the date of commencement.	QC) Manual; <ul style="list-style-type: none"> Occupational Health and Safety Manual; Contract Administration Manual; Supervision Manual; Operations and maintenance manuals
Monthly Progress Reports (Physical Progress, Financial Progress, Environmental and Social Safeguards)	Within 10 days of consecutive month	<ul style="list-style-type: none"> Progress on delivery of each of the outputs Key issues and constraints Attempts made to resolve the issues
Quarterly and/or Semi-annual Progress Reports (Physical Progress, Financial Progress, Environmental, and Social Safeguard)	10th day after completion of each quarter or semester as applicable	<ul style="list-style-type: none"> Progress on delivery of each of the outputs Key issues and constraints Updated project schedule Any changes in project design and details
Annual progress report	Each year	<ul style="list-style-type: none"> Summary of reporting requirements outlined above for all aspects of works and activities under the project
Commissioning and Operation Plans	3 months before completion of commissioning of the BDS and DNI system	<ul style="list-style-type: none"> Commissioning Plan of the Bulk Distribution and DNIs under implementation Operation Plan for water distribution in the completed DNIs on DMA basis
Final report	One month prior to contract completion date	<ul style="list-style-type: none"> Project completion report, and summary of all other reports, progress and issues under the project, summary of annual progress reports and PPMS; Completed PPMS End of assignment report

7. The indicative inputs, qualifications and experience of DSC personnel

The indicative inputs, qualifications and professional experience of key and non-key personnel to be deployed by the DSC are given in Table 2 below. Alternative inputs in the Proposal for cost efficiency from the Consultants are welcome.

Table 2: Indicative Inputs and Professional Requirements of Key and Non-Key Personnel

S.N.	Designation	Indicative Inputs	Indicative Requirements
International Key Experts¹			
1.	Team Leader (Urban Water Supply Specialist)	30	Bachelor in Civil Engineering (preferably postgraduate in water supply and sanitary/environmental/public health engineering or construction management) with minimum of 15 years' experience including minimum of 10 years' experience in design, construction supervision or project management of large water sector projects. Should have specific experience as

S.N.	Designation	Indicative Inputs	Indicative Requirements
			<p>the team leader for a minimum of two large water sector projects with a benefitted population of 1 million or more, and demonstrated experience managing large, interdisciplinary teams. Experience in Commissioning of large urban water supply systems and performance-based contracts for NRW reduction are desirable.</p> <p>Experience with externally-funded projects (ADB, World Bank, etc.) in the capacity of Team Leader/ Project Manager would be preferred. Experience working in South Asia will be advantageous.</p>
2.	Water Supply Network Modeler	6	<p>Bachelor in Civil Engineering (preferably post graduate in sanitary/environmental engineering/public health engineering) with minimum of 10 years' experience including minimum of 5 years of experience in hydraulic modeling of water supply networks of large urban/semi-urban areas with at least 1 million population.</p> <p>Experience with performance-based contracts for NRW reduction is desirable.</p> <p>Experience with externally funded projects (ADB, World Bank, etc.) and experience in multiple regions desirable.. Experience working in South Asia and Nepal will be advantageous.</p>
3.	Contract Management Specialist	8	<p>Bachelor in Civil Engineering (preferably post graduate in construction management or project management) with minimum of 10 years' experience in contract management, construction supervision and quality assurance of large construction projects. Experience in contract management of large water supply projects with population of 1 million or more will be desirable.</p> <p>Experience with externally funded projects (ADB, World Bank etc.) and experience in multiple regions desirable. Experience working in South Asia and Nepal will be advantageous.</p>
4.	SCADA Expert	10	<p>Bachelor in Instrumentation Engineering/ Electronics/Mechanical Engineering with minimum of 10 years of overall experience including at least 7 years of experience in design & operations of SCADA systems in urban/semi-urban water supply projects covering at least 1 million population.</p> <p>Experience with externally funded projects (ADB, World Bank, etc.) and experience in multiple regions desirable. Experience working in South Asia and Nepal will be advantageous.</p>
5.	Water Operations Expert	6	<p>Bachelor in Civil Engineering (preferably post graduate in sanitary/environmental engineering/public health engineering) with minimum of 10 years' experience including minimum of 5 years' experience in commissioning and operation of bulk and distribution</p>

S.N.	Designation	Indicative Inputs	Indicative Requirements
			<p>water supply systems in large urban/semi-urban areas with at least 1 million population.</p> <p>Experience with externally funded projects (ADB, World Bank, etc.) and experience in multiple regions desirable. Experience working in South Asia and Nepal will be advantageous.</p>
6.	Horizontal Direction Drilling (HDD) Expert	6	<p>Bachelor in Civil Engineering (preferably post graduate in sanitary/environmental engineering) with minimum of 10 years' experience including minimum of 5 years' experience in design and construction supervision of water supply system using HDD technology. Experience in HDPE pipe Jointing Butt Fusion/ Electro Fusion is desirable.</p> <p>Experience with externally funded projects (ADB, World Bank, etc.) and experience in multiple regions desirable. Experience working in South Asia and Nepal will be advantageous.</p>
7.	GIS Specialist	4	<p>Bachelor in geography, geospatial technology, IT or computer science (preferably post graduate) with a minimum of 5 years of experience as GIS specialist. Experience of implementing GIS mapping for the water sector and/or urban infrastructure would be preferred. Must have prior experience developing geo data bases for water (or other) utilities.</p> <p>Experience with externally funded projects (ADB or World Bank etc.) and experience in multiple regions desirable.</p>
8.	Structural Engineer	3	<p>Bachelor in Civil Engineering (preferably post graduate in structural engineering) with minimum of 10 years' experience in the field of structural engineering, including detailed design, engineering & preparation of detailed project reports for different types of structures. Experience in structural design computer programs and experience in design of large water retaining structures, bridges, retaining walls and/or other civil structures is required.</p> <p>Experience with externally funded projects (ADB, World Bank etc.) and experience in multiple regions desirable.</p>
9.	Occupational Health and Safety (OHS) Expert	3	<p>Bachelor in any subject (preferably Post Graduate in Environmental Sciences or any relevant field) with minimum of 7 years' experience in designing, supervising or monitoring of OHS activities in the construction-related field. Must hold an internationally-recognized certification in health and safety management and have familiarity with ISO 45001 standards.</p> <p>Experience with externally funded projects (ADB,</p>

S.N.	Designation	Indicative Inputs	Indicative Requirements
			World Bank, etc.) will be preferred and experience in multiple regions desirable.
9.	Unallocated ² (Water Treatment, Quality Assurance, Electrical and Mechanical Engineers, Archaeologist), etc.	8	-
	Total (International)	84	-
National Key Experts¹			
1.	Deputy Team Leader (Urban Water Supply Expert)	36	Bachelor in Civil Engineering (preferably postgraduate in sanitary/environmental/public health engineering) with minimum of 15 years' experience including minimum of 10 years' experience in design, construction supervision or project management of urban water sector projects. Should have specific experience managing as the team leader/deputy team leader of two urban water supply infrastructure projects with minimum benefitted population of 30,000. Experience with externally funded projects (ADB, World Bank, etc.) in capacity of Team Leader/ Deputy Team Leader/Project Manager would be preferred.
2.	Senior Contract Management Expert	30	Bachelor in Civil Engineering (post graduate preferred in construction management or project management) with minimum of 10 years experience in contract management, construction supervision and quality assurance of water supply or other civil work projects. Experience with externally funded projects (ADB, World Bank, etc.) will be preferred.
3.	Water Supply Network Modeler	8	Bachelor in Civil Engineering (preferably post graduate in sanitary/environmental/public health engineering) with minimum of 10 years' experience including minimum of 4 years' experience in modeling especially the hydraulic modeling of water supply network of urban/semi-urban areas. Experience with externally funded projects (ADB, World Bank etc.) would be advantageous.
4.	Structural Engineer	8	Bachelor in Civil Engineering (preferably post graduate in structural engineering) with minimum of 10 years' experience in the field of structural engineering, including detailed design, engineering & preparation of detailed project reports for different types of structures. Familiarity with structural design computer programs and experience in design of water retaining structures, bridges, retaining walls and/or other civil structures is required.

S.N.	Designation	Indicative Inputs	Indicative Requirements
5.	Procurement and Contract Management Specialist	12	Bachelor in Engineering (post graduate preferred) with minimum of 10 years' experience including minimum of 5 years' experience in procurement processes under multi-lateral donor funding and familiar with ADB procedures with regards to procurement on the basis of international bidding, national bidding and shopping procedures.
6.	Social Development/Safeguard Expert	24	Post Graduate in Social Sciences with minimum of 10 years' experience in social safeguards monitoring and mitigation. Should have experience in implementing social safeguard policies (resettlement, social impact assessment) and community-based projects. Experience with similar water supply development projects and particularly on Externally funded projects (ADB, World Bank etc.) will be advantageous. Preference will be given for experience in implementing and monitoring gender and social inclusion initiatives.
7.	Environment Expert	24	Post Graduate in Environmental Sciences / Engineering with minimum of 10 years of experience with knowledge of EIA studies and monitoring of the environmental parameters and mitigating measures. Experience with Externally funded projects (ADB, World Bank, etc.) will be preferred.
8.	Quality Control Engineer/Material Engineer	30	Bachelor in Civil Engineering, preferably post graduate in geotechnical/sanitary engineering with minimum of 7 years of experience in quality control and material testing. Experience in the field of water supply is preferred.
9.	Construction Supervision Engineers (13 persons for different durations)	240	Bachelor in Civil Engineering, preferably post graduate in sanitary engineering with minimum of 5 years of experience in construction supervision of works and quality assurance program. Construction supervision experience in the field of water supply is preferred.
10.	Construction Supervision Engineer (Road Reinstatement)	30	Bachelor in Civil Engineering with minimum of 5 years of experience in construction supervision of road works. The construction supervision experience of asphalt concrete is preferred.
11.	MIS Expert	24	Bachelor degree in Computer Science, Information Technology or any related discipline; Master's degree in related fields is an advantage; Minimum of 2 years experience in using database applications and software or programs, including knowledge of mobile phone-based applications (apps); and Willing to do field work activities in various KUKL/PID projects.
Subtotal (Key expert)		466	

S.N.	Designation	Indicative Inputs	Indicative Requirements
National Non-Key Experts (Provisional)³			
1.	Electrical Engineer	4	Bachelor in Electrical Engineering (post graduate preferred) with minimum of 10 years' experience in the field of electrical engineering. Experience in water supply and power system projects is desirable. Experience of externally funded projects (ADB, World Bank, etc.) shall be preferred.
2.	Mechanical Engineer	4	Bachelor in Mechanical Engineering (post graduate preferred) with minimum of 10 years of experience in the field of mechanical engineering. Experience in water supply and power system projects is desirable. Experience of Externally funded projects (ADB, World Bank, etc.) shall be preferred.
3.	Evaluation and Monitoring Expert	12	Bachelor in any related subject (post graduate preferred) with minimum of 10 years of experience in infrastructure projects and a minimum of 5 years of experience as evaluation and monitoring specialist preferably in externally funded projects.
4.	GIS Expert	4	Bachelor in any related subject (geography, urban planning, IT or computer science preferred) with a minimum of 3 years of experience as GIS specialist. Experience of implementing a GIS mapping for the water sector would be preferred.
5.	Quantity Surveyors	6	Bachelor in Civil Engineering with minimum of 3 years of experience in the design of water supply works and or preparing bill of quantities, cost estimates and bidding documents.
6.	Other unspecified (WTP experts, archeologist, architect, landscape developer, gender specialist, communications, etc.)	12	-
	Subtotal (Non key)	42	-
	Total National	508	-
	Total (International + National)	592	-

Notes:

¹The inputs are indicative. Consultants can submit their proposals with their own estimates.

² The Consultants should include in their proposals the unallocated inputs as provided in the table. The employer will use the inputs in any specific area of expertise as required by any specific task and activity at negotiated rates with the Consultant.

³ The Consultants should include in their proposals the specified expertise and the inputs under Provisional National Non Key Experts as provided in the table. The Consultant may use the provisional inputs as required by specific tasks with specified expertise at proposed rates with the prior approval of the employer.

The consultant shall propose **400 staff months Junior Engineers** with qualification of Diploma in Civil Engineering and minimum of 5 years of experience in water sector or Bachelor in Civil Engineering with minimum of 1 year of experience in construction works.

8. Specific Position-Based Terms of Reference

The specific TOR for each position is as follows:

8.1 Water Supply Specialist (International Key Expert), Team Leader

The Team Leader cum Water Supply Specialist shall take the overall responsibility for execution of the work in accordance with the ToR and also for the coordination of all professional inputs. He/she should be an excellent project manager skilled in leading multi-disciplinary teams while working in a complex institutional and physical environment.

The Team Leader is responsible for delivery of all services including detailed design reviews and updates, supervision, procurement and environment and social safeguards compliance. The Team Leader is responsible for coordinating the team, delineating personnel for execution of the assignments, managing implementation and ensuring quality of works and overall activities of the consultants. He/she is solely responsible for the design review and construction supervision of the project works. He/she shall also be responsible for overseeing the implementation of due diligence aspects into contractual agreements under the project. The Team leader should be competent in planning, design, contract management, resolving problems, quality maintenance, budgeting and financial control, progress monitoring, international procurement procedures, communication skills and documentation.

The Team Leader will act as the Client / Engineer's authorized representative for the design and supervision contract, with the authority to liaise with government authorities and make decisions on behalf of the Engineer on all matters pertaining to the consultancy services. He/she will also perform important role of coordinating the supervision teams, through the Engineers/other Consultant's field staff to achieve the project objective and to ensure that the technical requirements are correctly and consistently implemented during construction. The Team Leader shall, however, have no authority to relieve the Contractor of any of the duties or obligations under the contract or to impose additional obligations not included in the contract.

Further, the Team Leader will be responsible for workmanship, quality assurance, and certification of the contractors' payments. Some of the principal responsibilities of the Team Leader are as following which will include, but not be limited to:

- (i) Review existing studies/ documents and other resources available and formulate a best implementation approach including programmatic project schedule;
- (ii) Review the capital investment and asset management program (CIAMP) of the Valley and formulate implementation approaches aligning with its programs and advice improvements in the programs as necessary;
- (iii) Coordinate with stakeholders for the review of CIAMP and Design Reports earlier prepared;
- (iv) Oversee the preparation of detailed engineering designs and bidding documents prepared by other team members and coordinate implementation activities;
- (v) Assign various responsibilities to other members of the consultant team and monitor the activities;

- (vi) Analyse applicable standards and technical specifications and ensure availability of all goods, plants, equipment, vehicles etc., as specified in the standards and the technical specifications;
- (vii) Conduct other studies as deemed necessary by PID for the project implementation;
- (viii) Plan, control and manage the teams work and day-to-day management of project activities to PID's satisfaction;
- (ix) Develop implementation schedules and resource requirements to PID's satisfaction;
- (x) Supervise construction and monitoring of all the field activities to ensure quality standards;
- (xi) Monitor progress, evaluate results and identify/resolve constraints in a timely manner;
- (xii) Assess the progress of the on-going contracts and prepare/agree/implement recovery plans, if required;
- (xiii) Checking, verifying and certifying the contractors' payments certificates and recommend to PID for payments;
- (xiv) Coordinate activities with various agencies and stakeholders relevant to the project implementation, including communities, TLOs and NGOs;
- (xv) Prepare and organize orientation programmes for contractors, construction supervision and O&M staff;
- (xvi) Assist PID in preparing necessary documentation to get approvals/permits from concerned authorities and agencies for laying pipes and construction of other structures;
- (xvii) Assist PID in incorporating IT-based systems, including means and methods to conduct cost accounting and tracking expenditure;
- (xviii) Prepare reports including inception, design review and weekly, monthly, quarterly, commissioning and final reports;
- (xix) Prepare details for disconnection of the existing water supply pipelines and commissioning plan of new distribution systems on DMA basis within DNI Packages;
- (xx) Assist PID and the contractors in finalizing Quality Assurance and Quality Control Plan for implementation of various contract packages and ensure implementation of the finalized Plan;
- (xxi) Assist PID and the contractors in finalizing health and safety manuals and ensure implementation of the manuals;
- (xxii) Assist PID in preparing/updating contract administration manual and checklists with clear delineation of responsibilities for various levels of personnel involved in the contract administration;
- (xxiii) Evaluate various management software packages and recommend appropriate software for the use in the project and train PID staff on their use and also ensure use of such software by the contractors in the preparation and monitoring of the project activities;
- (xxiv) Prepare operation and maintenance manuals for the use of KUKL for the components being developed under the project;
- (xxv) Review and update guidelines for the assessment of NRW for the DNI works and develop NRW Reduction Strategies based on the outcomes of the assessment and ensure the implementation of such strategies;
- (xxvi) Identify the needs for engineering surveys and investigating accuracy of the baseline information carry out these survey works and PEMS;
- (xxvii) Update information on the status of existing water supply facilities, assessing their re-use on DMA basis;
- (xxviii) Verify the status of existing pipe mains, collecting information such as their age, type of materials, and type of joints, physical conditions, etc.;
- (xxix) Update, verify and confirm configuration of transmission mains, ring mains, feeder mains and transverse mains and service reservoirs along with their hydraulic and structural design features.
- (xxx) Finalize the hydraulic modelling and detailed design of distribution networks on DMA basis in conjunction with configuration of KUKL service areas;
- (xxxi) Review and approve the construction methodology and construction schedule submitted by contractors;
- (xxxii) Develop and implement consistent construction management system for the implementation of works;
- (xxxiii) Prepare drawings and cost estimates, tender document and technical specifications following government and ADB Guidelines;

- (xxxiv) Support PID in contract management and check, verify and certify contractor's payments certificates and recommend for payments;
- (xxxv) Prepare grievance redress mechanism and assist PID/CASSC in redressing the grievances;
- (xxxvi) Identify sites of archaeological and heritage significance, national parks and conservation areas, and prepare working procedures in such areas in close coordination with relevant agencies and institutions;
- (xxxvii) Identify the road reinstatement requirements and prepare plans for reinstatement in coordination with relevant agencies and institutions and ensure implementation according to the prepared plans;
- (xxxviii) Prepare project specific occupational health and safety plans and ensures implementation according to the plan;
- (xxxix) Assist and guide CASSC to prepare manuals and provide awareness training to KUKL and PID staff;
- (xl) Coordinate with relevant utility agencies for preparing project implementation plans and schedules, share with them the implementation plans and schedules, and ensure implementation according to the prepared plans and schedules;
- (xli) Prepare manuals for maintenance and observance of core labour standards at the work sites and assist PID and CASSC to orient stakeholders, specifically the contractors on the compliance of such core standards;
- (xlii) Assist PID and CASSC to ensure the implementation of CAPP and GESI Action Plan;
- (xliii) Identify the requirement for poverty and socio-economic survey and assist and Guide CASSC in the preparation of reports; and
- (xliv) Perform any other relevant tasks within the scope of services as requested by the Project Director, PID.

8.2 Water Supply Network Modeler (International Key Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Review existing topographical and geotechnical survey data and maps and design and carry out additional surveys as required;
- (ii) Configure the distribution zones and district metering areas (DMAs) in coordination with KUKL and its relevant Branch Offices;
- (iii) Prepare a hydrological model for different supply schemes, for 170 MLD scenario as well as 510 MLD at DNI level and optimize system operation;
- (iv) Conduct detailed engineering/hydraulic designs for water transmission pipelines, distribution networks, storage reservoirs, water treatment plants and other related structures, as deemed necessary;
- (v) Carry out hydraulic modelling and detailed design of distribution network on DMA basis in conjunction with the configuration of KUKL service areas;
- (vi) Provide support in bid document preparation and bid evaluation;
- (vii) Review and update the designs as per the site requirement during execution of works considering availability of pipes, pipefittings and other accessories;
- (viii) Assist PID and KUKL on the planning and implementation of water optimization studies;
- (ix) Conduct on-the-job training for PID and KUKL staff in hydraulic analysis and modeling of water supply system;
- (x) Prepare hydraulic network models for the water distribution zones and subzones with appropriate district metering approaches and prepare design reports for the same;
- (xi) Prepare/update hydraulic models for the bulk distribution system;
- (xii) Prepare specifications for network optimization in coordination with other Specialists;
- (xiii) Assist PID in hydraulic analysis of the existing water supply networks. Identify existing hydraulic constraints and their rectification for incorporation, if necessary, in the proposed program; and
- (xiv) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.3 Contract Management Specialist (International- Key Expert),

The key responsibilities will include, but not be limited to, the following:

- (i) Prepare overall implementation schedule and resource management and optimization plan;
- (ii) Assess the adequacy of contractors' inputs in terms of materials, equipment, construction machinery, workers, funds, and construction approach and methodologies;
- (iii) Assist the PID in preparing necessary documentation to get approvals/permits from all concerned authorities or any institutions for laying pipes and construction of other structures;
- (iv) Assist PID and the contractors in finalizing health and safety manuals, OHS guidelines and ensure their proper implementation;
- (v) Assist Team Leader and PID in contract management of all the contract packages under the respective loans implemented by PID;
- (vi) Assist contractors to prepare detailed working drawings and designs, and check contractors' designs and working drawings;
- (vii) Advise the team in reviewing and examining contractors' bills and recommending payments to contractors with special emphasis on minimizing the time taken in submission of bills by the contractors and payment received by the contractor against such bills;
- (viii) Guide consultant's own team in particular the Construction Supervision Engineers on their roles and responsibilities in day to day contract administration;
- (ix) Provide training and orientation to PID personnel on FIDIC procedures for administration of large contracts;
- (x) Assist PID in monitoring physical and financial progress against the contract milestones to ensure timely completion of contracts;
- (xi) Provide training and orientation to PID personnel on Quality Assurance and Quality Control (QA & QC);
- (xii) Assist PID in the examination of contractors' claims for time extension, variations, additional compensation, etc., and recommend appropriate decisions;
- (xiii) Assist PID in resolution of various contractual issues and in properly carrying out overall contract management and administration;
- (xiv) Assist PID after physical completion of contract in preparing planned maintenance procedures; check installation and commissioning; work as the verifier of the commissioning and performance testing for DNI and other packages, and monitor preparation of "as built" drawings;
- (xv) Assist PID in monitoring progress, evaluating results and identification and resolution of constraints;
- (xvi) Coordinate activities with various relevant agencies and stakeholders, including communities and NGOs;
- (xvii) Prepare and organize orientation program for contractors' construction supervision staff and O&M staff;
- (xviii) Assist PID in preparing contract administration manuals and checklists with clear delineation of responsibilities at various levels;
- (xix) Evaluate various management software packages and recommend appropriate software for use in the project; train/Orient PID staff on their use; and ensure use of agreed management software by the contractor in preparation and monitoring of the project activities;
- (xx) Assist PID in the management/administration of contracts and prepare necessary documents for dispute resolution, if any; and
- (xxi) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.4 SCADA Expert (International- Key Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Review and check/approve the Contractor's SCADA designs are robust and in accordance with the Contract Requirements;
- (ii) Review and check the materials of construction /design of all automated control valves proposed by the Contractor;
- (iii) Review and check/approve the SCADA software proposed by the Contractor;
- (iv) Review and check/approve the QAP of all materials proposed by the Contractor;

- (v) Review and check/approve/monitor the Contractor's work program;
- (vi) Review and check/approve/monitor Contractor's trail run/test plan;
- (vii) Review and check/approve/monitor the performance indicators of the SCADA system; and
- (viii) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.5 Water Operation Expert(International - Key Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Study and review of the plans, documents and drawings earlier prepared to gain an understanding of the BDS, the newly laid DNI system and the existing system, which will continue to be used to provide services to the consumers;
- (ii) Lead the entire commissioning team (PID, Consultant's and Contractor's designated personnel) in flushing, testing and disinfection of the entire system (BDS, SRTs and DNIs);
- (iii) Interacting with Senior managers/ Engineers/ Consultants/ Contractors/ Technicians and other stakeholders, including the officials of KVWSMB, KUKL and KUKL branch offices and PID as required to gain an understanding of the system;
- (iv) Ensure that all necessary tests, specified in the contract documents for any relevant sections, for the Pipes, SRTs, Valves, other Fittings and Accessories and Appurtenances are conducted before the system is put to service;
- (v) Making field visits and recommend for replacement of any fittings, pipes, and appurtenances to PID/KUKL as required if any, based on their defects, incompatibility to design, flow obstructions/ interference and inappropriateness to system functioning;
- (vi) Ensure the proper flushing and disinfection requirements as per standard practices;
- (vii) Ensure that the system and its accessories are in accordance to parameters of the design model, and as far as practical is calibrated by the contractors and checked and recommended by the consultant;
- (viii) Ensure that the network, SRTs and accessories are tested, disinfected and commissioned under a systematic approach following a methodical planning and its execution;
- (ix) Establishing a system inside KUKL for UFW control, including leak detection and management, and prompt and efficient repair/replacement of faulty pipes, joins, accessories when required;
- (x) Be involved in conducting job training of technical staff for O&M during commissioning of the schemes and needs identification including broad content design for further training requirements and providing guidance to development of checklists and SOPs for future repair and maintenance;
- (xi) Prepare/update template for step-wise NRW Commissioning Plan to be prepared by the contractor for each of the DMAs of the DNI works;
- (xii) Overall, to ensure that testing and commissioning of the system follows a planned approach and that the KUKL receives a system that is fairly stabilized and efficient for operation in a physical sense, after calibrations according to acceptable standards;
- (xiii) Assist PID staff to supervise the construction of transmission pipelines, distribution networks, storage reservoirs, water treatment plants and other related structures, as deemed necessary;
- (xiv) Configure the distribution zones and district metering areas (DMAs) in coordination with KUKL and its relevant Branch Offices; and
- (xv) Perform any other relevant tasks within the scope of services as requested by Team Leader/Project Director, PID

8.6 HDD Expert(International- Key Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Guide the contractor's personnel and monitor pipe laying works using trenchless technology with Horizontal Directional Drilling (HDD);
- (ii) Supervise all HDD relevant works in accordance with the specifications and other contract provisions;
- (iii) Review and check proposed HDD plan and alignment submitted by the contractor and approve;

- (iv) Analyze/check and interpret Subsurface Engineering Utility survey submitted by the contractor;
- (v) Monitor and report on the key elements of drilling including: the depth of the drilling pit / maintain insertion angle /Depth of receiving Pit / location drill bit as it progresses;
- (vi) Monitor, accept or reject mud fluid mix proposed by the contractor;
- (vii) Review and ensure that the HDD equipment have been mobilized with appropriate specifications, as specified in the bidding document;
- (viii) Monitoring of HDD Rig setup/entry angle setup/exit angle setup;
- (ix) Monitoring of the attachment of pipe to reaming attachment ensuring safety and efficiency and confirm that it is in accordance with the approved documents;
- (x) Monitoring of the pullback operation and ensure safety and efficiency at the work place; and
- (xi) Conduct training on HDD application and SUE to Contractors' personnel and PID/KUKL Engineers.

8.7 GIS Specialist (Key International Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Identify sources of information on the utilities and facilities for use in the preparation of GIS based information of the project;
- (ii) Develop a geodatabase for all project-related data and relevant protocols for data management;
- (ii) Prepare formats for uploading the project information in the public domain;
- (iii) Prepare user manuals for utilizing the information and public disclosure;
- (iv) Check and review as-built GIS data submitted by the contractors and confirm in accordance with required attributes;
- (v) Validate the data submitted by the contractors with sample field verification;
- (vi) Conduct training and guide to Contractors' GIS personnel;
- (vii) Monitor and advise preparation and uploading of project information the geodatabase/GIS platform, including GIS data collected by CIAMP-2 consultants and other entities;
- (viii) Ensure that the quality and accuracy of the information are properly maintained according to the international best practices;
- (ix) Prepare and update contributions to periodic reports and the final report;
- (x) Support, advise and prepare a detailed plan to operate new water facilities compatible to modern information technology with SCADA system;
- (xi) Support Team Leader, DTL and other experts in all aspects of IT and GIS related issues;
- (xii) Support TL/DTL in providing necessary reports and maps as demanded by PID; and
- (xiii) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.8 Structural Engineer (Key International Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Review existing soil investigation reports, if any, pertinent to the structural design work.
- (ii) Review all structural designs and necessary structural drawings and specifications, including components relating to reservoir construction/rehabilitation, water supply components, building construction and other structures done by the earlier consultant and revise/update wherever necessary;
- (iii) Review all the structural design of different components of the project under the scope of services and ensure compliance with applicable building rules of the country, with specific focus on compliance with seismic resistance requirements;
- (iv) Based on geo-technical investigation, carry out design of new RCC SRT at Balaju in compliance with applicable rules, norms and standards considering specific focus on compliance with seismic resistance requirements;
- (v) Advise supervision team about the checking requirements of all the structures during implementation; and
- (vi) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.9 Occupational Health and Safety (OHS) Expert (Key International Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Identification and assessment of OHS requirements;
- (ii) Review, update and prepare OHS manuals as per the site specific requirement and nature of works;
- (xiv) Guide and conduct training to PID/Safeguard Unit, CASSC, DSC and Contractors' personnel;
- (xv) Monitoring of OHS compliance in construction sites;
- (xvi) Support assessment of risks and evaluation of Contractors safety performance;
- (xvii) Support preparation of OHS-related reports;
- (xviii) Support Team Leader DTL and other experts in all aspects of OHS related issues;
- (xix) Develop specifications and method statements for OHS-related matters as they arise and where gaps are noted, and update PID's OHS manual as needed;
- (xx) Conduct site visits to monitor compliance with OHS measures and recommend corrective actions;
- (xxi) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.10 Water Supply Engineer (National Key Expert), Deputy Team Leader

The key responsibilities will include, but not be limited to, the following:

- (i) Assist the Team Leader in carrying out technical services as per the TOR and also work in the capacity of the Team Leader during his/her absence;
- (ii) Oversee the detailed designs and bidding documents prepared with coordination of other specialists;
- (iii) Assign various responsibilities to other members of the consultant team and monitor the activities;
- (iv) Lead construction supervision and monitoring of all the field activities to ensure quality standards;
- (v) Support Team Leader in checking, verifying and certifying the contractors' payment certificates and recommend for payments;
- (vi) Establish contract-tracking systems, including implementation schedules and milestones;
- (vii) Arrange orientation programmes for construction supervision, O&M staff and conduct the orientation for contractors in respect of government/ADB's procedures and guidelines;
- (viii) Develop manuals pertaining to Program quality assurance and quality control;
- (ix) Check contractors' proposals for compliance with all environmental and social safeguards requirements;
- (x) Review methodology, designs and organization proposals of the contractor;
- (xi) Assist PID staff in supervising the site activities of the contractor;
- (xii) Coordinate with local authorities and other relevant agencies and institutions as required for Project implementation;
- (xiii) Ensure that co-ordination and public awareness is maintained at all times;
- (xiv) Assist PID in supervising the construction of transmission pipelines, distribution networks, storage reservoirs, water treatment plants and other related structures, as deemed necessary;
- (xv) Ensure that as built drawings of all the completed works with complete information have been prepared immediately after the completion of any part of the works by contractors in prescribed format;
- (xvi) Conduct training program for O&M staff during commissioning of the schemes;
- (xvii) Prepare O&M manuals for built components; and
- (xviii) Perform any other relevant tasks within the scope of services as requested by the Team Leader and Project Director, PID.

8.11 Senior Contract Management Specialist (National- Key Experts),

The key responsibilities will include, but not be limited to, the following:

- (i) Act as Deputy Team Leader in the absence of Deputy Team Leader;

- (ii) Assist PID in preparing overall implementation schedule and resource management and optimization;
- (iii) Assist PID in assessing the adequacy of contractors' inputs in terms of materials, equipment, construction machinery, workers, funds, and construction approach and methodologies;
- (iv) Assist the PID in preparing necessary documentation to get approvals/permits from all concerned authorities or any institutions for laying pipes and construction of other structures;
- (v) Assist PID and the contractors in finalizing health and safety manuals, OHS guidelines and ensure their proper implementation;
- (vi) Assist Team Leader and PID in contract management of all the contract packages under the respective loans implemented by PID;
- (vii) Assist contractors to prepare detailed working drawings and designs, and check contractors' designs and working drawings;
- (viii) Advise the team in reviewing and examining contractors' bills and recommending payments to contractors with special emphasis on minimizing the time taken in submission of bills by the contractors and payment received by the contractor against such bills;
- (ix) Guide consultant's own team in particular the Construction Supervision Engineers on their roles and responsibilities in day to day contract administration;
- (x) Assist in training and orientation to PID personnel on FIDIC procedures for administration of large contracts;
- (xi) Assist PID in monitoring physical and financial progress against the contract milestones to ensure timely completion of contracts;
- (xii) Assist in training and orientation to PID personnel on Quality Assurance and Quality Control (QA & QC);
- (xiii) Assist PID in the examination of contractors' claims for time extension, variations, additional compensation, etc., and recommend appropriate decisions
- (xiv) Assist PID in resolution of various contractual issues and in properly carrying out overall contract management and administration;
- (xv) Assist PID after physical completion of contract in preparing planned maintenance procedures; check installation and commissioning; work as the verifier of the commissioning and performance testing for DNI and other packages, and monitor preparation of "as built" drawings;
- (xvi) Assist PID in monitoring progress, evaluating results and identification and resolution of constraints;
- (xvii) Coordinate activities with various relevant agencies and stakeholders, including communities and NGOs;
- (xviii) Prepare and organize orientation program for contractors' construction supervision staff and O&M staff;
- (xix) Assist PID in preparing contract administration manuals and checklists with clear delineation of responsibilities at various levels;
- (xx) Evaluate various management software packages and recommend appropriate software for use in the project and train/Orient PID staff on their use and ensure use of agreed management software by the contractor in preparation and monitoring of the project activities;
- (xxi) Assist PID in the management/administration of contracts and prepare necessary documents for dispute resolution, if any; and
- (xxii) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.12 Water Supply Network Modeller (National-Key Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Review existing topographical and geotechnical survey data and maps and design and carry out additional surveys as required;
- (ii) Configure the distribution zones and district metering areas (DMAs) in coordination with KUKL and its relevant Branch Offices;
- (iii) Prepare a hydrological model for different supply schemes and optimize system operation;

- (iv) Conduct detailed engineering/hydraulic designs for water transmission pipelines, distribution networks, service reservoirs, water treatment plants and other related structures, as deemed necessary;
- (v) Carry out hydraulic modelling and detailed design of distribution network on DMA basis in conjunction with the configuration of KUKL service areas;
- (vi) Provide support in bid document preparation and bid evaluation;
- (vii) Review and update the designs as per the site requirement during execution of works considering availability of pipes, pipefittings and other accessories;
- (viii) Assist PID and KUKL on the planning and implementation of water optimization studies;
- (ix) Conduct on-the-job training for PID and KUKL staff in hydraulic analysis and modelling of water supply system;
- (x) Prepare hydraulic network models for the water distribution zones and subzones with appropriate district metering approaches and prepare design reports for the same;
- (xi) Prepare/update hydraulic models for the bulk distribution system;
- (xii) Prepare specifications for network optimization in coordination with Non-Revenue Water Specialist;
- (xiii) Assist PID in hydraulic analysis of the existing water supply networks. Identify existing hydraulic constraints and their rectification for incorporation, if necessary, in the proposed program;
- (xiv) Review and update the design as per the site requirement during execution; and
- (xv) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.13 Structural Engineer (Key National Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Review existing soil investigation reports, if any, pertinent to the structural design work;
- (ii) Review all structural designs and necessary structural drawings and specifications, including components relating to reservoir construction/rehabilitation, water supply components, building construction and other structures done by the earlier consultant and revise/update wherever necessary;
- (iii) Review all the structural design of different components of the project under the scope of services and ensure compliance with applicable building rules of the country, with specific focus on compliance on seismic resistant requirements;
- (iv) Based on geo-technical investigation, carry out design of new RCC SRT at Balaju in compliance with applicable rules, norms and standards considering specific focus on compliance with seismic resistance requirements;
- (v) Advise supervision team about the checking requirements of all the structures during implementation; and
- (vi) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.14 Procurement and Contract Management Specialist (National-Key Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Review detailed engineering designs and prepare bid documents, specifications and other pertinent documents;
- (ii) Prepare checklist/documents for procurement audit;
- (iii) Support PID in the preparation of pre-qualification requirements and evaluation;
- (iv) Prepare bidding documents in compliance with GoN/ADB's latest standard bidding documents;
- (v) Design post-qualification criteria in compliance with Government/ADB's guidelines and evaluation;
- (vi) Assist PID in the evaluation of received bids for different contract packages;
- (vii) Assist PID to prepare contract packaging and preparing/updating procurement schedules for each contract package as per the approved procurement schedule;
- (viii) Assist PID procurement section and CAPMC to prepare, update annual procurement plan, master procurement plan, contract award and disbursement projection plan; and

- (ix) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.15 Social Development/Safeguard Specialist (National Key Expert)

Social Safeguard Specialist will be responsible for execution of all social works in accordance with TOR. The job responsibilities will include, but not be limited to the following:

- (i) Assist PID in preparation/updating of DDR/RAP/GESI documents under different packages;
- (ii) Ensure that any resettlement impacts occurring during construction that were not identified in the DDR/RAP are addressed in a manner consistent with Government and ADB policy and well-documented;
- (ii) Prepare the grievance redress mechanism and assist PID in its implementation;
- (iii) Assist PID in collaboration with CASSC in design, preparation, planning and management of the community participation and awareness program;
- (iv) Prepare an inventory and review recent and current community-based initiatives in urban areas of Kathmandu; organizations involved, mechanisms used, successes achieved;
- (v) Plan and deliver initial briefing, training and orientation to PID on community participation and awareness programs in collaboration with CASSC;
- (vi) Assist and advise PID on how to manage and co-ordinate the implementation of the environmental public health and water optimization awareness programs;
- (vii) Provide continuous guidance to CASSC in developing suitable mechanisms for participatory interaction with and training of local government and CBOs;
- (viii) Develop and implement specific measures to ensure participation of vulnerable groups, including women and the poor;
- (ix) Monitor performance and impact of the community participation in the field carried out by CASSC and if needed advise adjustments to the program; review field reports and advise PID on actions required; prepare annual reports on performance and impact of community participation and development activities;
- (x) Assist in preparation of Information, Education and Communication (IEC) materials and media campaigns, advertisement clippings, Web pages, etc. of the Investment Program;
- (xi) Prepare for documents in collaboration with CASSC for awareness campaign on (a) the need for and application of user charges for improved urban services, (b) water optimization and conservation program, (c) environmental and social issues, such as, and (d) resettlement entitlements through various media means;
- (xii) Disseminate information about the Investment Program to the target groups especially women. Assist CASSC for building stakeholders' awareness on the long-term benefits and short-term inconvenience of the Program in order to gain full support to the beneficiaries towards the Program;
- (xiii) Suggest CASSC to make the beneficiaries aware of preventive care to avoid any health related hazards;
- (xiv) Monitoring CASSC functions to make the beneficiaries aware of their responsibilities, including issues such as user charges and property tax reform etc. for achieving the goal of the program;
- (xv) Invite feedback from beneficiaries on aspects of the program and advise PID of how these might influence future program design;
- (xvi) Support KUKL in strengthening its GESI related strategies and activities;
- (xvii) Use the communications and education material already prepared or being prepared by CASSC and focus on implementation in project areas for packages under AF and develop new IEC materials;
- (xviii) Consolidate periodic reports and submit semi-annual social safeguards monitoring reports (SSMRs) to ADB; and
- (xix) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.16 Environmental Expert (Key National Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Review/prepare/update the necessary IEEs with corresponding EMPs in accordance with Government and ADB requirements for environmental assessment of subprojects and facilitate the review process with PID and ADB;
- (ii) Ensure the implementation of IEEs and EMPs are consistent with Government and ADB policies, and the EARF agreed upon by the Government and ADB;
- (iii) Provide advice and support to ensure PID obtains necessary Government approvals;
- (iv) Provide necessary guidance support in the classification, and development of all environmental safeguards documents including the provision of training for PID and KUKL staff and the contractors in the development and implementation of IEEs and EMPs;
- (v) Provide advice on environmental impacts and review the contractor's mitigation measures for all proposed construction works including reservoir construction/rehabilitation, water supply;
- (vi) Assist the PID in consolidating periodic reports and submit semi-annual environmental monitoring reports (SEMRs) to ADB;
- (vii) Prepare consolidated quarterly environmental monitoring reports and monthly reports on the implementation of mitigation measures by contractors using checklists;
- (viii) Provide advice to PID on regulatory requirements and standards;
- (ix) Assist PID in obtaining other related permits;
- (x) Ensure environmental monitoring consistency with the environmental monitoring plans in the IEEs and EMPs and consistent with the EARF agreed between the Government and ADB;
- (xi) Train contractors' staff in the implementation of environmental mitigation measures during construction and prepare environmental monitoring checklists during the periods of design and construction of project components;
- (xii) Monitor disclosure and public consultation and prepare periodic reports; and
- (xiii) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.17 Quality Control Engineer/Material Engineer (National Key Expert)

The Quality Control Engineer (Material Engineer) will be responsible for quality control of construction works. He or she will be responsible for supervising all the tests to be done in different stages of construction including testing to be conducted for different types of pipes, besides ensuring that specified tests are done as per code stipulations and as per the specifications laid down in the contract for all the different stages of construction. He or she shall provide all necessary assistance to the construction team with respect to all materials submittals, approvals, testing, sampling, etc. and participate in the quality control of materials including all the laboratory and field testing, acceptance of used materials, checking and accepting all remedial and corrective measures. He / she shall report to the Team Leader/ Deputy Team Leader and CS Engineer including Employer's representative as and when required on any problems associated with the quality of works and materials and suggest appropriate solutions by deciding on the needs and urgency of the problem.

The job responsibilities will include, but not be limited to the following:

- (i) Monitor and check the day-to-day quality control of the works carried out under the Contract; and countersign the progress payment certificates when the quality of the works is satisfactory;
- (ii) Review and make recommendation for approval of all submitted materials by the contractor;
- (iii) Immediately inform the Team Leader/Deputy Team Leader about the problems related to the quality and quantity of materials and works and to any instances of non-conformance of the "Contractor's works with the technical specifications" and / or the safeguard requirements;
- (iv) Supervise, participate and direct sampling and testing of all materials according to the contract and the specifications;
- (v) Maintain records of test results and all taken corrective actions;
- (vi) Track and review the site testing and certificates of compliance;
- (vii) Verifying adequacy of the Contractor's procedures for material testing and the setting up of the materials testing laboratory, in order that all testing carried out by the Contractor is in accordance with the testing procedures specified in the Specification;

- (viii) Verify that the Contractor's sources of construction materials, proposed materials to ensure that all materials used in the execution of the Project fully meet the Specification requirements, and verify the specification of the proposed material.
- (ix) Verify the Contractor's proposed material, specification, drawings, and ensuring compliance with the specification in every respect;
- (x) Verify the Contractor's trial works (e.g. cube tests, asphalt mix design and trial tests) to ensure that all works, proposed material and method are correct and fully meet the specifications;
- (xi) Ensure that the test certificates (all test certificates including type test certificate) of proposed plants, equipment like water meters and other construction meet the specification requirements
- (xii) Verify implementation of corrective actions and propose any modifications to the Contractor's activities relating to the inappropriate material or method that may be used throughout the period of construction works;
- (xiii) Assist the Team Leader/Deputy Team Leader in preparation of the monthly/quarterly report with regard to the quantity and quality aspects in accordance with the contract
- (xiv) Monitor the materials sources (quarries and borrow areas) to ensure that all environmental and social requirements are met; and
- (xv) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.18 Construction Supervision Engineers (Key National Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Supervise and monitor the contractors' activity to ensure satisfactory standards, quality assurance, control of workmanship and progress;
- (ii) Take measurements for the purpose of certifying payments and claims;
- (iii) Quality and quantity control of the materials and works;
- (iv) Coordinate with the relevant authorities on site during construction and acquire permissions, if needed;
- (v) Keep daily records of all aspects of their supervision works;
- (vi) Approve the materials and equipment brought by the contractors;
- (vii) Prepare and implement any minor adjustment required to the drawings and plans;
- (viii) Monitor the environmental impact during construction and coordinate with the environmental specialist;
- (ix) Check IPCs including measurement of work and certify payment;
- (x) Coordinate with other specialists for ensuring environment safeguard, proper implementation of resettlement action plan (RAP), community development, public awareness and training;
- (xi) Ensure proper co-ordination between contractors, that the authorities and the public are continually informed and consulted on the works program and of the pipe laying in particular;
- (xii) Coordinate with other specialists for ensuring quality aspects of construction materials, goods and civil works to achieve quality of final product;
- (xiii) Ensure that complaints from the public and other stakeholders are attended expeditiously and take the necessary action to resolve any conflicts arising;
- (xiv) Ensure that any dispute arising with day to day work is resolved at site level and if failed at site report it to Team Leader/Deputy Team Leader at the earliest;
- (xv) Advise Team Leader/Deputy Team Leader on claims, disputes and completions and defect corrections certification;
- (xvi) Report progress, trends which are likely out-come of contracts and other information;
- (xvii) Ensure that comprehensive records of the construction works and testing are maintained;
- (xviii) Supervise commissioning on completion and ensure that as built drawings/records and appropriate operation and maintenance manuals are prepared; and
- (xix) Perform any other relevant tasks within the scope of services as requested by the Team Leader/Deputy Team Leader.

8.19 MIS Expert (Key National Expert)

- (i) Review the existing data collection, processing system and information safekeeping practices of various KUKL/PID projects;
- (ii) Develop and maintain a computer-based document/action tracking system for the project;
- (iii) Develop a mobile phone-based application (app) that can be used in real-time monitoring of and reporting for projects;
- (iv) Provide overall assistance in the databasing of project reports, documents, maps and plans, including checklists and reports prepared during monitoring of contractors;
- (v) Assist in the documentation of reports and training/workshops;
- (vi) Maintain the project database system;
- (vii) Maintain MIS equipment;
- (viii) Assist in the preparation of reports and publications with the use of applicable computer-based applications;
- (ix) Provide assistance to project field offices; and
- (x) Perform other MIS-related functions within the scope of services as may be requested by the Team Leader.

8.20 Electrical Engineer (Non-Key National Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Review and update the design of electrical works, plants and equipment (Pumps/electric motors, power transmission lines, transformers, switchboards, indoor/outdoor and electric cabling and wiring, etc.) associated with the distribution network and bulk distribution system designs, as needed;
- (ii) Review and prepare if necessary the specifications and performance standards for the designed electrical works, plants and equipment to be supplied by the contractors/suppliers;
- (iii) Review and prepare necessary drawings of the electrical works, plants and equipment to be supplied by contractors/suppliers;
- (iv) Review the quantities of electrical works, plants and equipment supplied by the contractor;
- (v) Ensure that the contractors/suppliers have supplied and installed all electrical works, plants and equipment as per specification and bill of quantities;
- (vi) Review and examine the part of electrical works, plants and equipment included in contractors' bills and recommend payment of such part of the bills;
- (vii) Ensure that all electrical works, plants and equipment supplied by the contractors/suppliers meets the performance standard as provided in the bidding documents;
- (viii) Ensure the contractors/suppliers have provided necessary O&M manuals for all electrical works, plants, and equipment;
- (ix) Assist contractors in organizing and conducting training/orientation to the PID/KUKL staff to properly operate electrical works, plants and equipment;
- (x) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.21 Mechanical Engineer (Non-Key National Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Review and update the mechanical works, plants and equipment associated with the design of distribution network and bulk distribution system designs, as needed;
- (ii) Review and prepare if necessary the specifications and performance standards for the designed mechanical works, plants and equipment to be supplied by the contractors/suppliers;
- (iii) Review and prepare necessary drawings of the mechanical works, plants and equipment to be supplied by the contractors/suppliers;
- (iv) Review the bill of quantities of mechanical works, plants and equipment supplied by the contractors;
- (v) Ensure that the contractors/suppliers have supplied and installed all mechanical works, plants, equipment as per specification and bill of quantities;

- (vi) Review and examine the part of mechanical works, plants and equipment included in contractors' bills and recommend payment of such part of the bills;
- (vii) Ensure that all electrical works, plants and equipment supplied by the contractors/suppliers meet the performance standard as provided in the bidding documents;
- (viii) Ensure the contractors/suppliers have provided necessary O&M manuals for all mechanical works, plants and equipment;
- (ix) Assist contractors in organizing and conducting training/orientation to the PID/KUKL staff to properly operate electrical works, plants and equipment; and
- (x) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.22 Evaluation and Monitoring Specialist (Non Key National Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Prepare guidelines for carrying out performance evaluation and monitoring for the services improvement;
- (ii) Identify the needs for survey and investigate accuracy of the baseline information and carrying out these survey works as necessary;
- (iii) Updating information on the status of existing water facilities in GIS layers (with the GIS specialist);
- (iv) Collect information from the contractors and other sources and prepare and submit periodic reports such as monthly, quarterly, half-yearly, yearly to relevant authorities;
- (v) Monitoring and updating the targets identified in DMF;
- (vi) Prepare Project Performance Monitoring System (PPMS) within the three months of signing the contract and submit it to PID and ADB and regularly update on trimester basis;
- (vii) Prepare framework for continuous monitoring throughout the Project;
- (viii) Draft a conceptual design of the MIS/M&E program;
- (ix) Train PID staff in PEMS;
- (x) Collect all relevant baseline data and prepare reports accordingly;
- (xi) Assist PID in establishing an independent monitoring and feedback mechanism to ensure that the primary objectives of the Project are being met, and recommend ways to modification if any; and
- (xii) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.23 Quantity Surveyors (Non-Key National Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Identify the sources of locally available construction materials with updates and verify their quality for use in the project;
- (ii) Identify sources of goods and materials to be imported from other countries and verify their quality;
- (iii) Assist PID in preparing quality monitoring checklists and quality audit;
- (iv) Update and prepare inventory of the materials required to be used in the project and their unit prices;
- (v) Prepare the reports on the requirement of the quality, grades and specifications for the materials and goods based on finalized design of the project components;
- (vi) Prepare Quantity Estimates and Cost Estimates of the project components and update them for packages already prepared in the past;
- (vii) Prepare Bill of Quantities using international best practices for defined project components/ contract packages and sound engineering knowledge;
- (viii) Carry out quality survey/ testing for establishing quality of the locally available materials, if required;
- (ix) Prepare periodic reports on quality and availability of the materials to be used by the contractor in the construction of the project components;
- (x) Prepare detailed cost estimates of different packages with rate analysis as per procurement act, regulation and guidelines as required;

- (xi) Prepare detailed quantity estimate of all the pipes, pipe fittings, valves, connectors, necessary plants, equipment, other accessories, etc.; and
- (xii) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.24 GIS Specialist (Non-Key National Expert)

The key responsibilities will include, but not be limited to, the following:

- (i) Identify sources of information on the utilities and facilities for use in the preparation of GIS-based information of the project;
- (ii) Prepare formats for uploading the project information in the public domain as relevant;
- (iii) Prepare user manuals for utilizing the information and public disclosure;
- (iv) Check and review as-built GIS data submitted by the contractors and confirm in accordance with required attributes;
- (v) Validate the data submitted by the contractors with sample field verification;
- (vi) Conduct training and guide Contractors' GIS personnel;
- (vii) Monitor and advise preparation and uploading of project information in GIS platform;
- (viii) Ensure that the quality and accuracy of the information are properly maintained according to the international best practices;
- (ix) Prepare and update GIS-related aspects of periodic reports and the final report;
- (x) Support, advise and prepare detail plan to operate new water facilities compatible to modern information technology with SCADA system;
- (xi) Support GIS Specialist (International), Team Leader DTL and other experts in all aspects of IT and GIS related issues;
- (xii) Support TL/DTL in providing necessary reports and maps as demanded by PID; and
- (xiii) Perform any other relevant tasks within the scope of services as requested by the Team Leader.

8.25 Junior Engineers (National)

- (i) Work under direct supervision of CSE;
- (ii) Supervise and monitor the contractors' activity to ensure satisfactory standards, quality assurance, control of workmanship and progress;
- (iii) Take measurements for the purpose of certifying payments and claims;
- (iv) Quality and quantity control of the materials and works;
- (v) Keep daily records of all aspects of their supervision works;
- (vi) Submit the materials and equipment brought by the contractors for approval of CSE;
- (vii) Prepare and submit any minor adjustment required to the drawings and plans;
- (viii) Monitor environmental impacts and health and safety risks during construction and coordinate with the environmental specialist and OHS specialist;
- (ix) Coordinate with other specialists for ensuring quality aspects of construction materials, goods and civil works to achieve quality of final product;
- (x) Ensure that complaints from the public and other stakeholders are attended expeditiously and take the necessary action to resolve any conflicts arising;
- (xi) Ensure that comprehensive records of the construction works and testing are maintained; and
- (xii) Perform any other relevant tasks within the scope of services as requested by the Team Leader/Deputy Team Leader/Construction Supervision Engineer.

9. Project Time Schedule

The total duration of consulting service will be about (42) months. The consulting services are expected to commence from October 2019.

10. Payment modality

Payments will be based on submission of monthly time-based invoices.

11. Data Management, Filing and Handover

All reports, data, drawings etc produced under the project are property of the PID. The consultant should hand over all reports in both .pdf and editable formats (Word, Excel, etc) with each submission. All drawings should be handed over in .pdf and CAD files, and shapefiles provided for any and all GIS data. All GIS data should have proper metadata. The Consultant through the MIS expert is responsible for quality control of all data, files, drawings and reports, and maintaining a well-organized system of files and data that is set up in a shared MIS with PID over the duration of the project period.

12. Facilities, inputs and counterpart personnel

A. Facilities to be provided by the Client

- (i) The client will provide office space for the consultant at or near the PID office premises for the project period. However, the consultant shall be responsible for the flooring and furnishing, which will be managed from the provisional sum under this contract and returned to the PID after the completion of the consulting services. The consultant shall also be responsible for necessary maintenance of the office and will **include the associated costs in its financial proposal**. The geo-technical or any other survey as required will be managed through the provisional sum of the contract.
- (ii) PID will provide the Consultant all relevant studies, reports, data and maps that are in its possession.
- (iii) PID will assist the Consultant to acquire any other relevant studies, reports, data and maps from other sources at the expense of the Consultants themselves.

B. Facilities to be provided through the Civil Works Contracts

- (i) During the supervision of construction works, the Consultant's site supervision staff shall be provided with office space with necessary furniture and office equipment near each of the construction sites. Vehicles for construction supervision of contracts will be provided from the on-going civil works contracts.

C. Facilities to be provided by Consultant

- I. The Consultant shall carefully work out the number and position of support staffs including junior engineers (**at least 400 staff months**), lab-technicians, draft persons, CAD-operators, office managers, office secretaries, messengers etc., required for the proper delivery of the consulting services and will **include the associated costs in its financial proposal**. If the Client feels that any support staff are not adequate for performing the services, the Client will dictate to deploy such staff by the consultant from their own cost.
- II. The Consultant will provide all the office logistics and consumables such as computers, laptops, photocopiers, printers and other equipment and accessories for the entire contract period including other facilities for the entire contract period. Needed supporting staff and communication expenses are also to be included. The Consultant will set out these requirements in the technical proposal and include the associated costs in the financial proposal.
- III. The vehicles for supervision services (2 numbers \geq 1000cc car and 2 numbers \geq 2500cc 4-wheeled drive vehicles and 7 number of motor bikes) shall be purchased from the provisional sum under this contract and shall be well maintained during the contract period and returned to the PID after the completion of the consulting services and thereby, will be the property of the PID. However, the maintenance and operation of these vehicles during the contract period will be the responsibility of the consultant. The

cost for the repair/maintenance of these vehicles and equipment including fuel, lubricant, drivers, vehicle registration renewal and insurance etc. shall be included in the financial proposal.

- IV. All the vehicles handed over to the PID shall be in good operating condition.
- V. The consultant shall for its own use install and manage at its own cost power backup system with adequate capacity for uninterrupted operation of computer, printers and internet and communication services.