SECTION C

PROJECT BRIEF

PART 1A

CONSULTANCY SERVICES OVERVIEW

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1. PROFESSIONAL SERVICES TO BE PROVIDED

1.1 PROFESSIONAL SERVICES AGREEMENT

The Consultant shall be appointed under the terms and conditions of the Professional Service Agreement (PSA) General Conditions of Engagement 2010 (Revision A), to provide Professional Pre-contract Design Consultancy Services to the Infrastructure Affairs – Drainage Networks Design Department (DNDD) of the Public Works Authority (herein after referred to as the Infrastructure Affairs (IA)).

1.2 GENERAL SCOPE OF PROFESSIONAL SERVICES

The general scope of the professional services to be provided by the Consultant is the design of the new trunk sewer network as an extension to IDRIS-the strategic interceptor sewer in Qatar South. The trunk sewer will be designed for the full build scenario with an estimated population for year 2060.

The key objectives of the design service include the design of a strategic sewer network serving the existing and planned development with a specific intention that the dependency on PTPs should be eliminated or substantially reduced and the pumping system shall be converted into gravity system by abandoning the pumping station, if found economical.

The scope comprise carrying out topographic survey, geotechnical investigations, condition assessment of PTPs and pumping stations, conceptual design, preliminary design, detail design, tender documents and tender procedure for the foul sewerage system required to service the needs of the ultimate development of the Project Area for the design horizon. The existing PTP's and Pumping Stations shall be disengaged from the existing sewer system (which is not part of this contract) after the successful construction/ commissioning of trunk sewer.

SEWERAGE SCHEME

Prepare Engineering designs for the sewerage system as detailed in the Project Brief for the project area. The design services shall include but not be limited to:

Investigation Stage – Data collection, review of available data and reports, study of existing gravity/interceptor sewer system in the Project Area, carrying out topographic survey, geotechnical investigations, condition assessment of PTPs and pumping stations, coordination and data collection from various stakeholders of their existing networks, utilities, PTPs and Pumping stations in the area.

a) *Site Investigation Works (Provisional Sum)* – Field survey (topographical survey along the trunk sewer alignment), Geotechnical survey (borehole, trial pits, etc.), utility survey and pipe ROW survey, condition assessment of PTPs and pumping stations, as required.

b) *Concept Design Stage* - During the Concept design stage the Consultant has to identify, outline, develop and evaluate minimum five alternatives for the project. Based on the topographic survey and other investigations, minimum five (5) concept design options are to be proposed for the trunk sewer alignment covering risks during design, construction and operation stages of the project. The concept design stage shall also broadly identify works required for reaching out to existing and proposed package treatment plants, pumping stations, coverage of new areas within the project areas, environmental and traffic issues, outline cost estimate of works as mentioned in the scope. The specific activities include collection and review of historical documents, preliminary site assessment, initial environmental assessment, development and evaluation of alternatives, economic analysis, and risk analysis, contracting strategy, value engineering and peer review. The design has to be prepared to the extent necessary to produce an estimate within ± 25 percent. The work shall include initial

surveying, hydraulic design and modelling, life cycle cost analysis, block diagram and schematic layouts. The Consultant shall recommend the preferred scheme using scoring matrix considering technical feasibility, operational flexibility, economic, social, environmental and cultural factors.

c) *Preliminary Design Stage* – The Preliminary design shall commence based on the approval of concept design option(s). Two options are to be developed with details and best suitable option is to be derived based on technical, economic, constructability, safety and operational flexibility aspects. It shall include design of strategic sewer network, connectivity details from existing pumping stations and PTPs, land area for pumping stations (if required) & PTPs / STPs, stakeholder approval, outcomes of Value Engineering and Contract strategy workshops, risk analysis and mitigation measures, detailed cost estimate and life cycle cost.

d) *Detail Design Stage* – Based on approved alignment option/s at preliminary stage, the detailed design report, sewer alignment layout plans, longitudinal section drawings, standard drawings and detailed final cost estimate are to be prepared for the works. The detailed design report shall also cover methodology for works to be carried out as part of decommissioning of the existing pumping stations / PTPs once the trunk line is tested and commissioned. The report shall also detail out the provision of interface with existing PTPs and Pumping station works. Traffic Management Plan (TMP) and Environmental Management Plan (EMP) are an integral part of this design.

e) *Tender services* - Prepare tender documents as per Ashghal Standards, provide tender clarifications as and when required, conduct tender evaluation and prepare evaluation report.

f) *Contract services* – prepare Contract document and contract drawings.

g) *DCU Clearance* - Document Control Unit clearance.

2. DESIGN TEAM REQUIREMENTS AND CONDITIONS

The provision of the prescribed and specified minimum Project Design Team, in terms of format, structure, qualifications, experience, location, and dedication of individuals to full time or part time commitment is an integral part of the services the Consultant must provide in the fulfilment of this Professional Services Agreement.

2.1 Design Team Members

The Consultant shall provide the following project design team which shall include as a minimum but not necessarily be limited to:

Professional / Key staff

- Project Manager (Team Leader)
- Senior Design Engineer – (Sewerage)
- Civil Design Engineer (Sewerage)
- Structural Engineer
- Mechanical Engineer
- Electrical Engineer

Specialist staff (Non-key staff)

- Quantity Surveyor

- Hydraulic Modeller.
- Geotechnical Engineer

Support staff (Non-key staff)

- CAD Technician
- Secretary
- Support staff (document preparation & accountant works etc)

2.2 For the basic minimum qualifications and criteria of the professional staff making up the project team, the Consultant is required to refer to the Project Brief.

2.3 The Consultant is to note that the qualifications and criteria requirements stated therein are to be strictly adhered to.

Consultants not nominating such candidates shall be immediately disqualified; the Consultant's attention is directed Clause 3.2 below in this regard.

- Project Manager (Team Leader) and the Senior Civil Design Engineer shall be resident in Doha, Qatar full time for the full duration of the contract.
- The Project Manager shall be dedicated for at least fifty percent (50%) of the time to the project for the full duration up to the completion of the Detail Design and tendering. The Project Manager shall be made available from the start of the project until project closure
- Minimum of one Senior Design Engineer shall be dedicated at least seventy five percent (75%) of the time to the project during the investigation, concept and Detail Design stage
- Minimum of one Civil Design Engineers, shall be dedicated for 100% of the time to the project for the full duration up to the completion of the Detail Design
- Minimum of one Mechanical Design Engineers, shall be dedicated for at least fifty percent (50%) of the time to the project for the full duration during investigation and concept stage
- Minimum of one Electrical Design Engineers, shall be dedicated shall be dedicated for at least thirty percent (30%) of the time to the project for the full duration during investigation and concept stage

2.4 All engineers involved in the projects shall be familiar with a) design manual, State of Qatar, Public Works Authority and b) Qatar Construction Specification (QCS 2014). The Mechanical and Electrical Engineers shall be familiar with the Kahramaa regulations.

2.5 All engineers involved in the Project are required to register with the Qatar's Professional Engineering Council (PEC) according to 'LAW NO. (19) OF 2005 REGULATING THE PRACTICE OF ENGINEERING PROFESSIONS. The project design team members shall have the following minimum qualifications and experience:

(1) **PROJECT MANAGER (TEAM LEADER)**

(a) The team shall be led by the Project Manager who shall be a European or US Registered Chartered /Professional Engineer or equivalent with PMP certification.

(b) Shall have at least 15 years demonstrable experience encompassing sewerage system design including pumping station, trunk and area sewerage, specification and implementation of works of a similar nature and extent to that of the Project, and must have managed at least two (2) projects similar to that of the Project in the Qatar / Middle East.

(2) **SENIOR DESIGN ENGINEER (SEWERAGE)**

(a) Function as Deputy Project Manager and shall be a degree qualified Registered Chartered / Professional Engineer or equal approved and preferably with PMP certification.

(b) Shall have at least 15 years demonstrable experience encompassing sewerage network design including design of truck sewers, micro tunnelling sewers, condition assessment of pumping stations, etc., and must have at least two years current experience in similar projects in Middle East.

(3) **CIVIL DESIGN ENGINEER**

(a) Shall be a degree qualified Professional Engineer or equal approved.

(b) Shall have at least 10 years demonstrable experience encompassing sewerage system design including truck sewers, micro tunnelling sewers and must have at least two years current experience in similar projects in Qatar / Middle East.

(4) **MECHANICAL, ELECTRICAL AND INSTRUMENTATION, CONTROL AND AUTOMATION ENGINEER**

(a) Shall be a degree qualified / Professional Engineer or equal approved and familiar with Kahramaa regulations.

(b) Shall have at least 10 years demonstrable experience encompassing the mechanical and electrical aspects of pumping station design, specification and implementation of works of a similar nature. They must have at least two years current experience in similar projects in Qatar / Middle East.

(5) **STRCTURAL ENGINEER**

(a) Shall be a degree qualified / Professional Engineer or equal approved.

(b) Shall have at least 10 years demonstrable experience encompassing the structural design aspects of deep manholes, pumping station, specification and implementation of works of a similar nature. They must have at least two years current experience in similar projects in Qatar / Middle East.

(6) **HYDRAULIC MODELLER**

(a) Shall be a Degree *qualified Professional Engineer or equally approved.*

(b) Shall have at least 10 years demonstrable experience covering wastewater collection network hydraulic modelling, performance assessment of sewer and urban drainage systems, modelling solutions for feasibility of construction.

(c) Shall be computer literate with experience of InfoWorks CS/ICM and MapInfo, model build and verification, options assessments, and solution development.

(7) **QUANTITY SURVEYING**

(a) Shall be a degree qualified Professional Engineer or equal approved.

(b) Shall have at least 10 years demonstrable experience encompassing pumping station (upgrade/refurbishment), and area sewerage schemes, preparation of specification, BoQ, contract documentation, legal advice to the client and implementation of works of a similar nature and extent to that of the Project, and must have managed at least two (2) projects similar to that of the Project in the Middle East / Qatar.

(c) The Consultant shall employ an approved Quantity Surveying practice duly registered with the “Engineers’ Accrediting and Classifying Committee” for all Quantity Surveying related services in the Professional Service Agreement General Conditions of Engagement 2010 Edition (Revision A). The sub-consultant’s details shall be entered in relevant Appendix – ‘Sub-consultants’ of Section D of this document.

(8) **PROJECT DESIGN TEAM MEMBERS** (others)

All other project design team members shall be suitably degree qualified with professional status and with minimum 7 years demonstrable relevant design experience, preferably in Qatar / Middle East.

2.6 All design and reporting shall be conducted in the Consultants Doha Office, also for reporting (professional staff) minimum fifteen percent (15%) of (allocated time) contract period with client premises for progress meetings, discussions etc, and support staff minimum ten percent (10%) of contract period with client premises for organising deliverable, project filing etc.

2.7 The Consultant shall submit with his Tender named and nominated individual members who will make up the Project Design Team, as specified in the Project Brief, who will be dedicated to undertake the Project.

2.8 Specialist staffs who are not required to be permanently based in the Consultants Doha Design Office, as specified in the Project Brief, but who is part of the Project Design Team shall be clearly identified in the submitted Tender. The periods that they will be in Doha (Qatar) for familiarisation, design, reporting, and liaison shall also be clearly stated in the submitted Tender.

2.9 Where any staff are to be used on a temporary basis for the Project, the written agreement from the staff's manager confirming and demonstrating their commitment to the Project Schedule shall be provided with the returned Tender and as otherwise appropriate.

2.10 The percentage allocation for all professional team members to be assigned to the Project for the design period shall be entered on the *Design Staff Utilisation Schedule & Staff Assignment Programme* distinguishing between those with short-term specialist input and those dedicated "full time".

2.11 A written commitment by the successful Consultant nominating the project staff, their participation allocations, etc. in compliance with the above, the Project Brief, and the PSA Agreement in general shall be submitted to the IA for approval; *design work shall only commence subject to the approval of the IA.*

2.12 On award of the Contract to the successful Consultant, all the specified Design Team staff candidates are *subject to final approval* by the Engineer based on candidate's availability, suitability in terms of the IA's requirements, the PSA, and the Project Brief.

2.13 Acceptance of the Tender as a whole will not imply automatic approval of any staff candidates submitted with the Tender. Full submissions will be required to be presented to the Engineer for his written approval as required by the Conditions of Engagement, and the Project Brief.

2.14 It shall be noted that the above mentioned positions are indicative and the Employer has the right to deploy and /or not to deploy any of the said positions. The employer has the right to request more staff, as required, without any change in rates at any time during project execution.

2.15 The Consultant shall obtain the Employer approval for all candidates and shall agree the start date for each one. The Project manager shall be made available from the start of the project until project closure.

2.16 Outsourcing design works is permitted under the following conditions:

Consultant shall outsource part of the design work to their parent company or registered sister companies overseas in full compliance with the design staff requirement specified under item 2 – Project Design Team Requirements and Conditions. Also the consultant shall provide evidence of their agreement with their parent company or registered sister companies overseas in this regard.

The Concept design has to be fully carried out at Doha office. However, PWA reserves the right to accept or reject the outsourcing arrangement for detail design works at the time of tendering.

Out sourcing is limited to staff other than Project Manager (Team Leader) and Senior Civil Engineer, who shall reside in Doha during the project duration as stated under above clause. The outsourcing staff members shall spend at least 15% of (allocated time) contract period with client premises for familiarisation of progress meetings, discussions etc.

3 TENDER CONDITIONS

3.1 General

The Consultant's attention is drawn to Section A (Instructions to Tenderers) and Section G (Pricing Schedule) of the Tender Document which specifies the minimum information and documentation to be submitted with the Tender.

Failure to nominate the prescribed Professional Staff with the specified qualifications and experience will result in the tender being immediately disqualified.

3.2 Mandatory requirements

3.2.1 It is mandatory to ensure that the following technical requirements specified in the tender are fully complied.

S.No	Description	Minimum requirements
1	**The Consultant shall have international reputation in the design, construction supervision and management of wastewater projects.**	Completed at least 3 Sewerage network design contracts in Qatar / GCC including trunk sewer, pumping station and rising main, in the last 10 years each not less than the Project value of QR 200 million
2	Professional / Key staffs	Qualification and experience as specified in "Project Brief"

3.3 Any clarifications / comments relating to the Project Brief and Scope of Works shall be requested at least two weeks prior to the tender submission.

4 CONTRACT GENERAL CONDITIONS

4.1 General

4.1.1 Where additional services are required by PWA to be carried out, such services shall be commenced only on the written instruction of the IA and in accordance with the PSA General Conditions of Engagement 2010 Edition (Revision A).

4.1.2 The Consultant's attention is drawn to the fact that the successful Consultant will be required to possess Professional Indemnity Insurance in accordance with the PSA General Conditions of Engagement 2010 Edition (Revision A).

4.1.3 The Consultant shall notify the IA timely of changes or circumstances which may result in additional services or extensions of time in accordance with the PSA General Conditions of Engagement 2010 Edition (Revision A).

4.2 TIME FOR COMPLETION

4.2.1 The Time for Completion of the whole of the Services in accordance with the PSA's Memorandum of Agreement is to be completed in accordance with the following Completion Milestone Stages are as defined below:

(A) COMPLETION MILESTONE STAGE (1)

All services up to and including the **Investigation and Concept Design stage** in accordance with the Project

- Time for completion: **151 calendar days** after the commencement of the Contract

(B) COMPLETION MILESTONE STAGE (2)

All services up to and including the **Preliminary Design Stage** in accordance with the

Project Brief.

- Time for completion: **273 calendar days** after the commencement of the Contract

(C) COMPLETION MILESTONE STAGE (3)

All services up to and including the **Detail Design Stage** in accordance with the Project

Brief.

- Time for completion: **365 calendar days** after the commencement of the Contract

(D) COMPLETION MILESTONE STAGE (4)

All services up to and including the **Tender Stage & Contract Stage Services** in

accordance with the Project Brief.

- Time for completion**:** **546 calendar days** after the commencement of the Contract

(E) COMPLETION OF THE WHOLE OF THE CONTRACT SERVICES

All services up to and including whole of the contract services, in accordance with the

Project Brief including but not necessarily limited to Project Brief.

The whole of the services and any outstanding balance works necessary for the completion

of the services.

- Time for completion**:** **546 calendar days** after the commencement of the Contract

4.2.2 The time for completion of the whole of the Services includes for the time taken for the processing of documentation for tendering and award of contract by the Authority. Should any circumstances beyond the control of the Consultant delay the process beyond the time allowed then the IA will issue an Addendum to the PSA for an extension of time accordingly.

4.3 PROJECT DESIGN TEAM

It is an express condition of contract that the minimum Project Design Team in terms of format, structure, qualifications, experience, location, and dedication of individuals to full-time or part-time commitment is adhered to; the Consultant's attention is drawn to the Professional Services Agreement, Conditions of Engagement.

4.4 FEES & PAYMENTS

The Consultant's lump-sum fee shall be comprehensive and shall be the full inclusive cost of the services and duties in every respect and of all general liabilities and obligations and things set forth or implied for the execution of the services and duties as described in the Project Brief and Conditions of Engagement.

The Consultant's rates are deemed to include for all things necessary to execute the services and costs, salaries, etc., for materials, resources, plant, equipment, transport, personnel and back up services, etc., as set forth or implied as described in the Project Brief, Conditions of Engagement and Tender Document in general.

The Consultant's fee shall be paid in accordance with Schedule B to the Memorandum of Agreement as set out in the Fee Schedule of this Tender Document.

5 TECHNICAL EVALUATION CRITERIA

5.1 Technical

The weightages for assessing the technical criteria in the tender process are as follows:

S.No	Criteria	Description	Score	Total score
1	Consultant experience	Relevant experience and track record of the Consultant firm (10 years of experience)	10	25
		Technical expertise as stated in the tender documents	10	
	Past / Relevant performance	Performance letter from Client on completed projects	5	
2	Professional staff and other personnel	Technical qualification and experience in design and project management of the following personal as stated in the tender documents		40
		a) Project Manager	10	
		a) Other Professional / Key Staff	20	
		b) Other staff / Non key staff	10	
3	Quality of offer	Understanding the project, local knowledge, clarity of Scope and method statements provided	20	30
		Project Program	5	
		Completeness of tender requirements	5	
4	Quality management and HSE	Operate certified quality management system (ISO 9001) Health and Safety management system (OHSAS 18001 and Environmental management system (ISO 14000); Project specific quality and HSE plan	5	5
	Total Score			100

5.1.1 The tenderer shall achieve a minimum of 70% over all in the technical evaluation for qualification. The tenderers who achieves less than 70% in the overall technical evaluation will be disqualified and the commercial offer will not be considered for further evaluation

5.2 Commercial

The technically prequalified tenderer who offers the lowest tender price shall be considered for award of the Contract subject to tenderer satisfying the terms and conditions of the Employer as stipulated in the tender document. The Employer's decision is final and binding.

CONTENTS

1 BACKGROUND

The project area is located within Qatar Area referencing System (QARS) Zone 55,56,57,81 & 91, approximately 20 km to the South West of the center of Doha. The project area is spread across areas namely Al Sailiya Army camp, Police Training Centre, Doha Industrial Area, Qatar Economic Zone-2 (QEZ-2) and Labour camp etc.

The project boundary is defined to the North by Al Maqran / Al Waab street, South by East West utility corridor, East by Abu Hamour Cemetery and West by Abu Nakhla and Utility corridor as shown below.

The project area 'Area-1' is shown as follows:

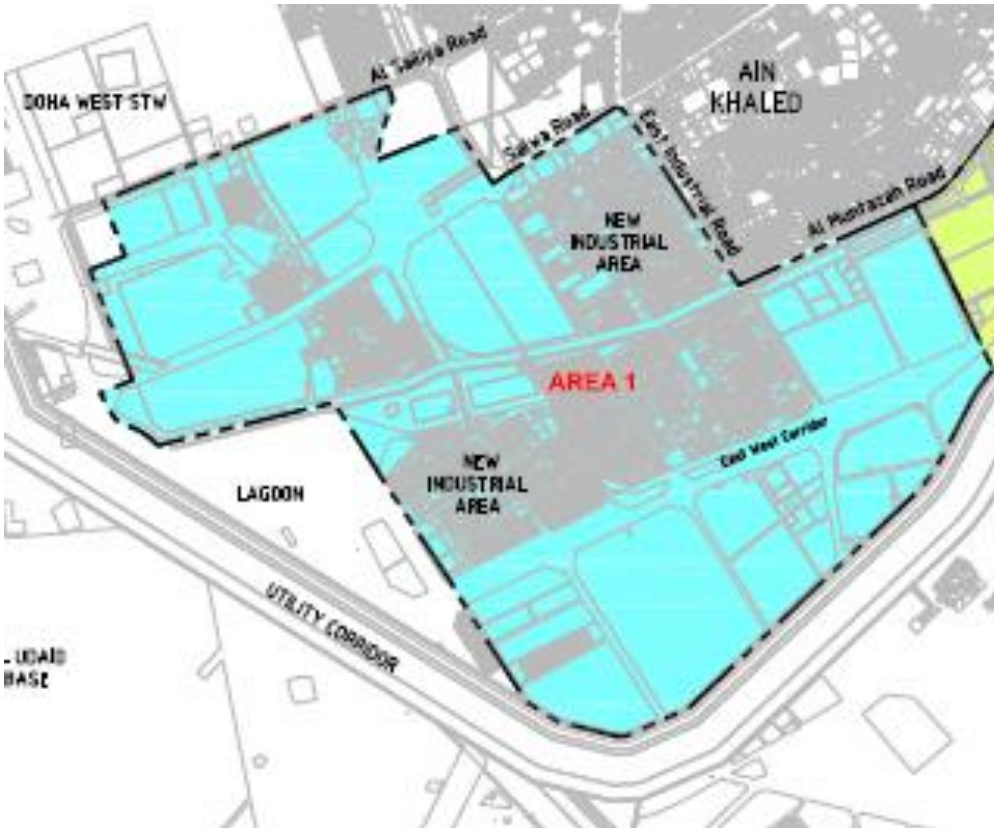

Figure 1: Project Area 'Area 1'

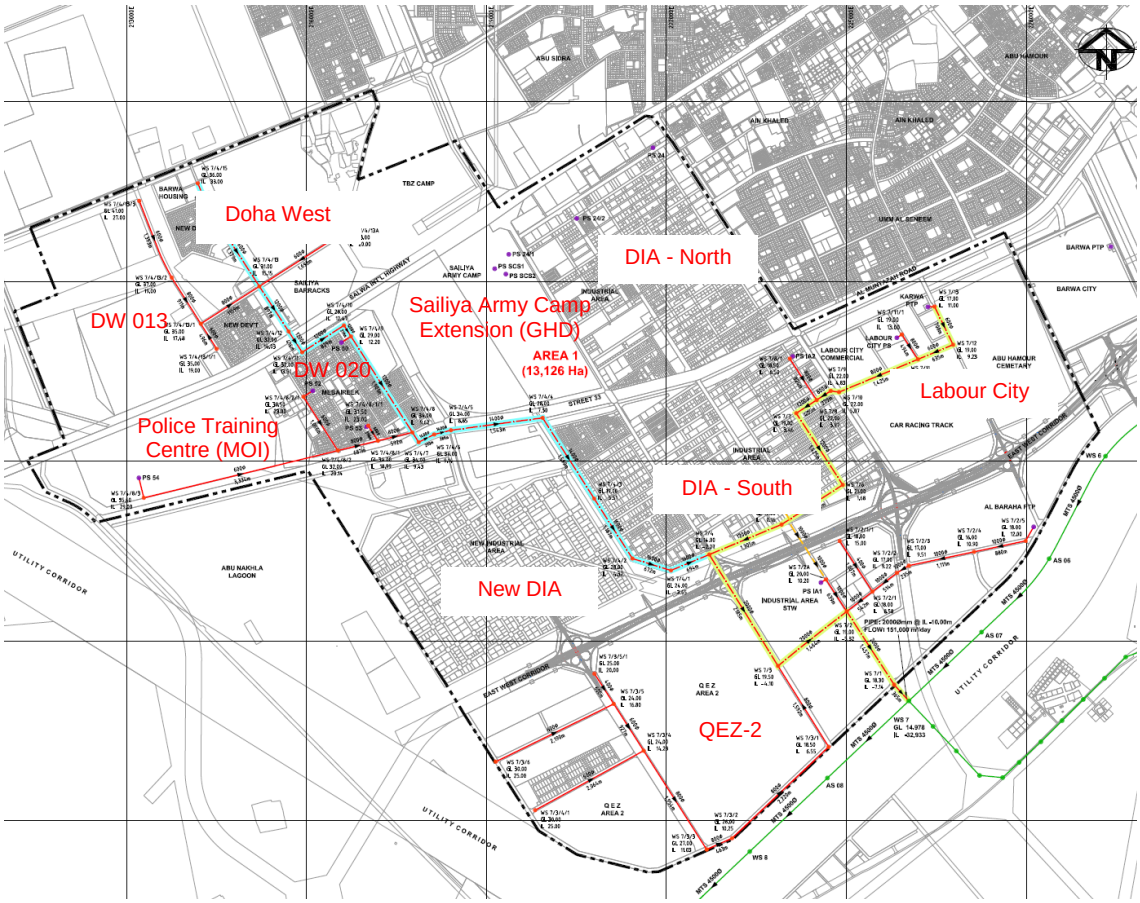

Figure 2: Project Area 'Area-1' covering Sewer Catchments in Doha West, Doha Industrial Area (DIA), Labour City and Qatar Economic Zone, QEZ-2

1.1 EXISTING SYSTEM

The project area is divided into four major parts namely Doha West, Doha Industrial Area (DIA), Labour City and Qatar Economic Zone-2 (QEZ-2); these areas are shown in Figure 2. The area of coverage is approximately 13,126 Ha.

1.1.1 DW013 Project Area

There is no existing sewerage system available in the north of Salwa road. A new sewerage system is proposed under Doha West project, DW013, of Local Roads and Drainage Program (LRDP).

Figure 3: Location map of DW013 project areas

1.1.2 DW020 Project Area

To the South of Salwa Road, existing sewer network connects to various pumping stations viz PS 52, PS 53 & PS 54 discharging flows to PS 50 pumping station. The PS 50 pumping station receives sewage flow from gravity sewers and rising mains from the upstream catchment areas. Further, the flows from PS050 are being pumped to Doha West STW.

Figure 4: Location map of DW020 and Police Training Centre

The Police Training Centre is partly developed as per their master plan and the existing foul sewerage is transported using tankers. There is no existing sewerage system available in Sailiya Army camp extension.

1.1.3 QS001 – Doha Industrial Area

The Doha Industrial Area (DIA) is divided in to two major areas viz DIA North (North of Al Muntazah Road / Street no.33) and DIA South. DIA North is having an existing sewer network discharging sewage to PS IA02 located south of Al Muntazah road. The existing capacity of Pumping Station, PS IA02, is 360 lps and it is proposed to upgrade to an additional 360 lps, thus the total capacity of the pumping station will be approximately 720 lps by year 2017.

DIA South, there is no existing sewer network (except DIA & IA trunk sewers) and this area is proposed to connect to proposed trunk sewer under QS001, LRDP project and finally all DIA area discharges to IA-Sewage Treatment Works (STW), of total capacity 60,000 m^3/day by the year 2017, via terminal pumping station PS-IA1. The New DIA area is having existing sewer network and connects to existing DID Trunk Sewer leading to DIA-STW.

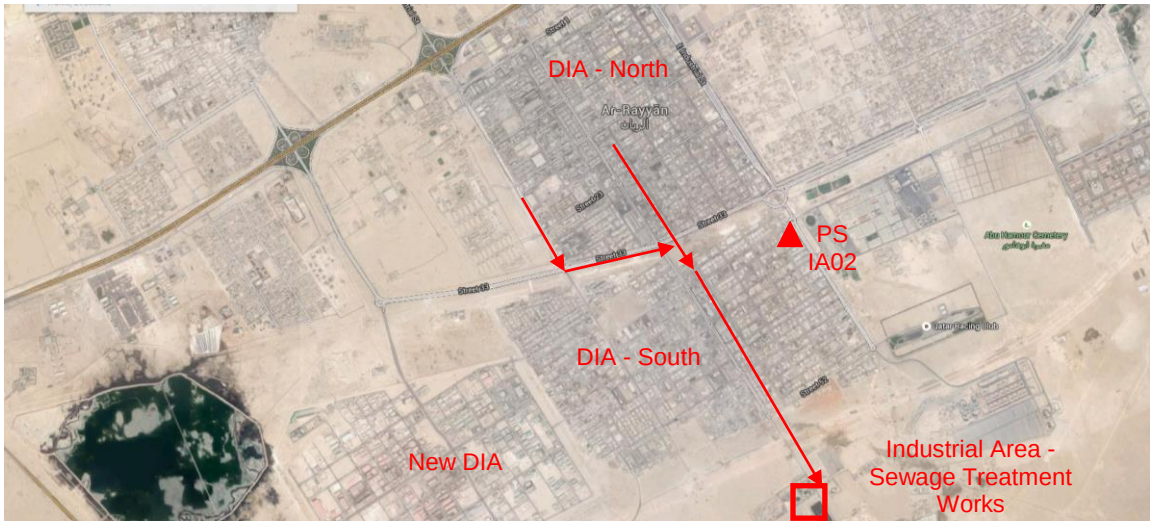

Figure 5: Location map of Doha Industrial Area

1.1.4 Labour City

The Labour City is having a 'Labour City' pumping station which currently discharges to IA trunk sewer via 600mm dia pumping main leading to existing IA-STW.

Figure 6: Location map of Labour City, Karwa PTP & Al Baraha PTP

The local sewer network with in Karwa & Al Baraha are being discharge to respective PTPs.

At present, there is no existing sewerage system available in QEZ –2, but the design of the new network is proposed under Qatar South area, QS004 project, of Local Roads and Drainage Program (LRDP).

The location of the project area, the boundary of the interceptor sewer and two trunk sewer options are given in the below mentioned drawings.

1. C829-DD-FS-1101, Proposed Interceptor Sewer Layout, Option-1
2. C829-DD-FS-1102, Proposed Interceptor Sewer Layout, Option-2

These options are given for reference only and these are to be further developed / included while preparing the concept design options.

2. CONSULTANCY SERVICE OBJECTIVES AND PROJECT SCOPE / REQUIREMENTS

The key objectives of the design service includes the following:

1. Design a strategic sewer network serving the existing and planned development with a specific intention that the dependency on PTPs should be eliminated or substantially reduced.
2. The dependency on pumping system shall be reduced by proposing gravity system wherever found economical.

The detailed scope of work / Project requirements include but not necessarily limited to the following:

(1) To carryout catchment study to understand the existing foul sewer network discharging into various Package Treatment Plants and Pumping Stations in the project area.

(2) To establish the extent of the existing, proposed and planned developments within the Catchment and Project Area. The Consultant shall co-ordinate with other stakeholders and obtain plans for their existing and proposed development in the project area. Assess potential new areas / un-sewered areas viz Police Training Centre (MoI), Sailiya Army camp extension, etc to be connected to the proposed trunk sewer. Analysis of existing pumping scenario and develop options to divert foul sewage flows to proposed trunk sewer which meets Ashghal's long term objectives. Adopt a holistic approach based on cost benefit analysis.

(3) To conduct topographic survey, geotechnical investigations, groundwater investigations, utility survey and pipe ROW survey, condition assessment survey of pumping stations and treatment works and any other study/investigation in the project area, required for sewer design.

(4) Propose for client's selection, at least five alignment options for gravity interceptor / trunk sewer network originating from last manhole of each PTPs and Pumping Stations mentioned above (Clause 2.1, 2.2 & 2.3 in the project brief) for ultimate discharge into various IDRIS shafts as shown in the project drawings.

(5) Technical evaluation, project cost estimate and life cycle cost analysis of proposed options and recommendations.

(6) Assessment of existing packaged treatment plants and pumping stations in the project area to identify and quantify works that are required to divert those flows to the interceptor sewer of this project. The physical connection may not be a part of this project scope but Consultant shall incorporate this information in their detailed design report for future use by IA.

(7) Prepare Concept Design with at least five alternatives incorporating above points for the project area to the approval of PWA.

(8) Prepare Preliminary Design with two best suitable options derived from the Concept design for the trunk sewer alignment for the Project Area to the approval of PWA.

(9) Prepare Detailed Design of one option derived from the Preliminary design and Tender Documentation for the scope of works that shall be constructed to suit agreed budget provisions for construction scheme to the approval of PWA.

(10) Prepare Traffic Management Plan to minimize disruption to traffic and facilitate meaningful control during the construction works.

(11) Prepare Environmental Management Plan to minimize the environmental impacts of the project during design, construction and operation stage.

(12) It should be noted that Infrastructure Affairs (Drainage) are at present rationalising the utilisation of foul sewage pumping stations. Hence it would be prudent not to propose options that require new pumping stations.

(13) Prepare Engineering designs for sewerage system as detailed in Clause 6 of this report for the project area. The design services shall include but not be limited to:

a) *Investigation Stage* – Data collection, review of available data and reports, study of existing gravity / interceptor sewer system in the project area, carrying out topographic survey, geotechnical investigations, groundwater investigation, condition assessment of existing pumping stations and package treatment plants to identify and quantify works required to connect them to the network, co-ordination with other stakeholders for their utility services,

b) *Concept Design Stage* – Based on the topographic survey and other investigations, minimum five (5) concept design options to be proposed for trunk sewer alignment covering risks during design, construction and operation stages of the project. The concept design stage shall also broadly identify works required for reaching out to existing and proposed package treatment plants, pumping stations from the network, environmental and traffic issues, outline cost estimate of works as mentioned in the scope.

c) *Site Investigation Works (Provisional Sum)* – Field survey (topographical survey along the trunk sewer alignment), Geotechnical survey (borehole, trial pits, etc.), utility survey and pipe ROW survey, as required.

d) *Preliminary Design Stage* – The Preliminary design shall commence based on the approval of concept design option(s). Two options are to be developed with details and best suitable option is to be derived based on technical, economic, constructability, safety and operational flexibility aspects. It shall include design of strategic sewer network, connectivity details from existing pumping stations and PTPs, land area for pumping stations (if required) & PTPs / STPs, stakeholder approval, outcomes of Value Engineering and Contract strategy workshops, risk analysis and mitigation measures, detailed cost estimate and life cycle cost. Based on alignment option/s, the preliminary design report, sewer alignment layout plans, standard drawings and preliminary cost estimate have to be prepared for the works. The preliminary design report shall also quantify the future works required to connect / divert flows from the pumping stations and packaged treatment plants to the network. The report shall also contain method statement on micro tunneling works where proposed, environmental and traffic management plan to be followed during construction.

e) *Detail Design Stage* – Based on approved alignment option/s at preliminary stage, the detailed design report, sewer alignment layout plans, longitudinal section drawings, standard drawings and detailed final cost estimate are to be prepared for the works. The detailed design report shall also cover methodology for works to be carried out as part of decommissioning of the existing pumping stations / PTPs once the trunk line is tested and commissioned. The report shall also detail out the provision of interface with existing PTPs and Pumping station works.

Traffic Management Plan (TMP) and Environmental Management Plan (EMP) is an integral part of this design. The report shall also contain detail quantification works required for the connections of existing pumping stations and package treatment plants to the proposed networks as part of this contract. The detailed design report shall also contain method statement on micro tunneling works where proposed, environmental and traffic management plan to be followed during construction.

f) *Tender services* - Prepare tender documents as per Ashghal Standards, provide tender clarifications as and when required, conduct tender evaluation and prepare evaluation report to the satisfaction of PWA.

g) *Contract services* – prepare Contract document and contract drawings as per PWA norms.

h) Document Control Unit (DCU) clearance as per the PWA standards / norms.

3 SCOPE OF SERVICES

3.1 GENERAL

3.1.1 The scope of services to be provided by the Consultant is defined but not necessarily limited to the requirements given in the PSA and as supplemented by this Project Brief.

3.1.2 The Consultant shall gather and study all available supporting information and incorporate it as appropriate and as agreed with the IA into the Scope of Services deliverables.

The location of the project area, the boundary of the interceptor sewer and two trunk sewer options are given in the below mentioned drawings.

1. C829-DD-FS-1101, Proposed Interceptor Sewer Layout, Option-1
2. C829-DD-FS-1102, Proposed Interceptor Sewer Layout, Option-2

These options are given for reference only and these are to be further developed / included while preparing the concept design options.

3.1.3 It may be necessary to investigate beyond this boundary to ensure that project objectives are achieved and maximised. Where this could result in a significantly expanded work scope (more than 20% increase in Project Area for example) further incorporation of such elements into the works shall be as agreed with the Infrastructure Affairs (Drainage).

3.1.4 The Consultant shall undertake all works necessary for preparing detail design as described culminating and including the preparation of fully detailed and complete Tender Documentation for inviting competitive tenders for construction of all Works as described.

3.1.5 Detail design is required for the interceptor / trunk sewer in the catchment areas (Area-1) to serve all existing and planned developments to the extent agreed with the IA.

3.1.6 The Consultant shall undertake additional geotechnical site investigation work in accordance with IA requirements.

3.1.7 The Consultant shall undertake all works necessary for the preparation & approval of any environmental assessments or conditions required by the Supreme Council for the Environment & Natural Reserves (if necessary).

3.1.8 The Consultant shall undertake:

i. Condition Assessment of existing packaged treatment plants and pumping stations in project area to identify the possibility to connect them to the network in future in accordance with IA requirements.

ii. Concept design for trunk sewer in project area.

iii. Conduct Value Engineering process for option selection.

iv. Preliminary design for trunk sewer in project area.

v. Detailed design for trunk sewer in project area.

vi. Prepare tender documentation for trunk sewer and associated works within the project area.

vii. Tender query response and tender evaluation during tender process.

viii. Project close out from Document Control Unit (DCU)

3.1.9 The Consultant shall build a computerized detailed hydraulic model of the Strategic sewer network. Consultant should propose suitable hydraulic model package (eg. Sewer CAD, Info works etc.) to IA for approval. The hydraulic model and model build report shall be supplied in hard copy and digitized formats to meet IA requirements (i.e. model submission to IA shall be formulated using Info works software). Both input data and output data (results) shall be clearly defined so that future modifications and/or additions can be made to the model. The consultant needs to follow hydraulic modelling protocols for the delivery of the models.

3.1.10 The Consultant shall prepare a Traffic Management Plan (TMP) to control and minimize disruption to traffic during the construction works The Consultant shall undertake all essential works necessary for the Detail Design of all aspects of the project area sewerage systems, including preparation of Tender Documentation (i.e. Drawings, Bills of Quantities & Specification etc.,).

3.1.11 The Consultant shall undertake the Technical and Financial review of the Tenders and prepare reports and recommendations thereof.

3.1.12 Any discrepancies between the specification and drawings shall be brought to the notice of the Engineer for approval.

3.2 SUPPORTING INFORMATION AND ASSOCIATED REQUIREMENTS

3.2.1 Information for developing the scheme is available from several sources. The Consultant shall obtain and review all relevant information and is responsible for determining that any data obtained is adequate and accurate for the Project design requirements. If any data is considered unsound or inadequate, the Consultant shall obtain additional data as necessary to satisfy the design requirements with no recourse to additional fees.

All information sources consulted and utilised shall be stated in Concept Design Stage Report.

All data and information provided and collected during the course of the project shall remain or become the properties of the IA, and shall be passed to the IA when the design is completed and/or included in the reporting as appropriate.

3.2.2 The Consultant shall visit Government Ministries and discuss the Project requirements with the Officers concerned and obtain the following:

i) Development plans from the Planning Authorities (UPDA/MMAA): The Consultant shall be responsible for obtaining all action plans necessary for the design from Planning Authorities and will be required to pay any costs associated with the supply of the drawings, which the Planning Authority may charge. IA will assist in certifying the list of plans required by the Consultant prior to ordering. Where information is available in digital format the Consultant may be required to provide the requisite number of blank diskettes for accommodating the data. Planning Drawings are likely to include the most current Planning intentions therefore all digitised information shall be checked against Planning Drawings. The Consultant shall also ascertain the nature of developments (land use plan) assigned to sub-divisions as appropriate.

ii) Population data from Central Statistical Organisation.

iii) Utility services data from the relevant agencies including:

- Water supply data and pipeline route from Qatar General Electricity and Water Corporation.
- Electricity cable routes from Qatar General Electricity and Water Corporation.
- Gas and oil pipeline data from Qatar Petroleum and Qatar Gas.
- Telecommunication cable routing from Q-Tel.

The Tenderer is to note that some utility agencies may charge for supplying asset information.

iv) Infrastructure database information from The Centre for Geographic Information Systems (GIS). Note that GIS charge for information from some agencies.

v) Survey sheets from the MMAA Survey and/ or IA GIS Sections.

vi) Road alignment and level information from Roads Design Department (IA).

vii) Existing sewer record plans, sewage treatment works and pumping station data sheets from Assets Affairs. Records of pumping hours, flow-meter data, pump output verification tests and maintenance details as necessary and available. The Consultant shall liaise with the appropriate officials of AA O&M Department to ensure design proposals are consistent with their requirements.

viii) Existing available site investigation data from IA. Reference to this data shall not relieve the Consultant of his geotechnical investigation scope.

3.2.3 Records of existing and planned services shall be obtained through a Design Enquiry. The Consultant shall be responsible for submitting the enquiry to the relevant Ministry / Department. The enquiry should be accompanied by an introductory letter, which will be issued by IA shortly after the engagement of the Consultant. The Consultants design obligations shall not be relieved by the period(s) that transpires for each enquiry return, and sufficient allowance is deemed included in the Consultants Design Programme for the return of such enquiries. All correspondence relating to Design Enquiries shall be copied to IA.

3.2.4 The Consultant shall produce combined utilities (electricity, water, telecommunications, etc.) drawings showing all existing and proposed services; requirements should be confirmed with IA prior to submission. This should be submitted as part of the draft Detail Design Report.

3.2.5 The Consultant shall check with all Government Departments regarding other existing or proposed projects that may impact on the design in the project area.

3.2.6 The Consultant shall nominate an Engineer to be responsible for coordinating and communications with other consultants, Government Departments, etc. regarding the planning and engineering of any schemes that could influence the Project for schemes within or adjoining the Project Area boundary. All requests for obtaining technical information regarding such schemes shall be made through Drainage Design Department of IA.

3.2.7 The Consultant shall analyse collected information and confirm in the Preliminary Design Stage Reports, the sufficiency of information to enable finalisation of Engineering Designs. The reports shall include section(s) demonstrating how the information has been utilised for establishing design criteria and outlining any information that is incomplete or assumptions made. The Consultant may present the analysis as a separate report where this would progress establishing design criteria. The information and analysis of such reports shall be included in the Preliminary Design Report.

3.2.8 The interpretation of information shall be discussed with the IA and/or other Government Authorities as necessary to obtain confirmation thereof.

3.2.9 The Consultant shall be responsible for establishing the most up-to-date list of approved proposed buildings within the project area. This information can be collected from Building Permits Section (Doha Municipality) in order to locate proposed location of drainage assets within the property boundary.

3.2.10 The consultant shall refer the following details provided in below table for major stakeholder information:

Stakeholders	Purpose
External stakeholders	
MMUP (Wakra/ Rayyan/ Doha)	Land expropriation
	Land acquisition for ROW clearance
	Land encroachment
MoE	EIA
	Geo Environmental
Kahramaa- Electricity & Water	Necessary approvals
Al Baraha Township	Coordination
Karwa development	Coordination
Ministry of Energy and Industry Department	Coordination
Industrial Area – commercial and residential development	Coordination
Sailiya Army camp	Coordination
Police Training Centre (MoI) and their township	Coordination
Qatar Economic Zone, QEZ-2, their PMC and the Design Consultants for their developments.	Coordination
Q-Rail designers & contractors for their ongoing projects & proposed projects.	Coordination
PEO (Private Engineering Office) projects, their Consultants & Contractors.	Coordination
Qtel, Vodafone and other Telecom Companies.	Coordination
Internal stakeholders	
Local Roads and Drainage Program (LRDP); PB	Coordination
PWA O&M Department, O&M Framework contractors for the operation & maintenance of PTPs in the project area.	Coordination
PWA Expressway program, PMC, consultant's and contractor for their ongoing projects & proposals; KBR	Coordination
IDRIS program PMC, consultants & contractors for their ongoing works & proposals; CH2MHill	Coordination / Data collection
Master plan, QIDMP, MWH Consultants	Coordination

3.3 INFORMATION UPDATING

3.3.1 The Consultant shall be responsible for digitising any maps and/or development plans that are not available in digital form and are needed to complete the Tender Drawings. All plans shall be developed from digitised GIS base maps (available with PWA – for current and

future scenarios) at the commencement of this PSA's Design Services. Developed plots shall show buildings in symbolic format where the available digital information is incomplete.

3.3.2 The Consultant shall update the digitised base maps, development plans, other planned information or other available plans with information from field surveys for current and future scenarios.

3.3.3 Details of all existing and proposed roads and development subdivisions shown on the Development Plans (policy plan) current at the commencement of this PSA's Design Services shall be added and shall be updated prior to the submission of detail design stage.

3.3.4 Existing or proposed road and grading levels shall be added to the extent that they are available from, Planning Authorities or Roads Design Department (IA).

3.3.5 The Consultant shall also superimpose any proposed design data (pipe & manhole positions, sizes, invert levels, etc) onto the survey drawings.

3.3.6 The dedicated storage media (hard disk minimum 1TB) for data storage & new laptop / computer for data analysis for engineers use, shall be provided by the Consultant within one month after signing the contract. Both the equipment shall be returned to Engineer one month after completion of the contract period. Computer and software specifications and versions shall be agreed at the time of the contract.

3.4 SURVEYS

a. MANHOLE SURVEY

3.4.1 The Consultant shall undertake detailed survey of the last (terminal) manhole at each of the existing pumping station or packaged treatment plant from where the flow is contemplated for diversion to the new trunk sewer network. The Consultant shall also undertake detailed survey of the discharge chambers for the rising mains of the pumping stations if any.

3.4.2 The terminal manhole survey shall establish future requirements for connecting existing manhole to new manhole of trunk sewer network, requirements for providing stub ends to terminal manhole etc. The survey information shall be updated and incorporated into Design drawings for future references.

3.4.3 The Consultant shall undertake manhole survey as detailed below

1. The Consultant shall survey and prepare individual plans showing existing manhole in the project area at a scale of 1:25. These shall show existing location of manhole / discharge chamber, location of all visible services. The plan shall be submitted on paper and AutoCAD compatible drawing file.
2. Only Survey companies approved by Infrastructure Affairs and PWA Survey Department shall be used for survey works and only bid proposals including such companies will be accepted.

b. TOPOGRPHICAL SURVEY

3.4.4 The Consultant shall undertake a field survey as detailed below

i) A Field survey shall be carried out to establish the ground level along the gravity trunk sewer network in the Project area and identify topographical and other features which could influence the design. As a separate layer on the drawing file the Consultant shall mark his proposals for the new trunk sewer network and this shall be submitted to the IA for approval.

ii) The topographical survey will be limited to a position and allows for a general level survey across the project area at minimum grid intervals of 50 meters.

iii) The survey shall be undertaken all along the new trunk sewer network route and for all five options of alignment.

If survey information for any road in the project area has been captured less than 12 months ago and is available with the Consultant, then the road stretches do not require to be surveyed, the scope of survey work shall be agreed/identified and stated in the tender submission.

iv) Only Survey companies approved by Infrastructure Affairs and PWA Survey Department shall be used for survey works and only bid proposals including such companies will be accepted.

v) The Consultant shall provide 2 copies of the field survey findings in a report (scope of work, method statement etc.,) & drawing format (contour maps-1m interval, spot heights in 2D and 3D formats, control stations, permanent & temporary-bench marks etc.,) in soft and hard copies.

3.4.5 Infrastructure Affairs reserves the right to modify the number or length of field survey in which case, fees for this part of the survey works shall be paid "pro-rata" to the number/length of field survey.

3.4.6 The Tender price includes all costs associated with the tendering, awarding and managing of a contract for the survey services. The cost of the actual survey will be paid by the consultant.

4. PROJECT SPECIFIC INFORMATION AND REQUIREMENTS

The Consultant has to collect project specific information and details from the LRDP and PWA-O&M department and other relevant stakeholders viz Al Baraha Township, Karwa development, Ministry of Energy and Industry Department, Industrial Area – commercial and residential development, Sailiya Army camp, Police Training Centre (MoI) etc.

Following details are the list of projects under Local Roads and Drainage Program (LRDP) at various design and construction stages:

S.No.	Project Number	Project Description	Project Status
1	DW020	Roads and Infrastructure in Mebaireek (Zone 81)	Concept design is approved.
2	DW013	Roads and Infrastructure in Al Sailiya – North of Salwa Road	The project is in construction and planned completion is by year 2017.
3	QS001	Roads and Infrastructure in Doha Industrial Area (Total seven packages)	Package-1, 4 & 5 area is having existing sewer network. Package-2 & Package-6 are in tender. Package-3 is in detailed design stage. No Foul Sewerage component in Package-7. All packages are planned to be completed by year 2018.
4	QS004 (QEZ Area-2)	Roads and Infrastructure in Wadi Aba Saleel	The project is in detailed design stage.

Note: Apart from above LRDP projects, the consultant is required to co-ordinate with masterplan consultants (QIDMP – Qatar Integrated Drainage Masterplan).

4.1 DESIGN SERVICES

4.1.1 All design, drawings, specifications and tender documents shall fully comply with PWA Design Manual and its latest amendments and Qatar Construction Specification (QCS) 2014.

4.1.2 Consultant to execute the design for new trunk sewer network as an extension to IDRIS-the strategic interceptor sewer. The trunk sewer will be designed for the full build scenario with an estimated population for year 2060.

4.1.3 Design a strategic sewer network serving the existing and planned development with a specific intention that the dependency on PTPs should be eliminated or substantially reduced.

4.1.4 Study the existing / proposed sewer network in the Project area

4.1.5 The Consultant shall undertake condition assessment of the existing packaged treatment plants and pumping stations to assess the scope of works required in future to divert the flows to the new interceptor sewers.

4.1.6 Design a strategic sewer network serving the existing and planned development with a specific intention that the dependency on pumping stations should be eliminated or substantially reduced by diverting the flows through a gravity system to the new interceptor sewers (IDRIS).

4.1.7 The proposed design shall include all the habitations in the surrounding areas. The system shall be designed for the ultimate development of the project area and checked for the present flow conditions.

4.1.8 Carry out all the necessary investigations, planning, environmental assessments, concept, preliminary and detailed design, capital budgetary cost estimates, life cycle costing, tender documents, tender processes and contract documentation for the strategic sewer network for the project area.

4.1.9 The project deliverables are a) Concept design report b) Preliminary design report c) Detail design report d) Tender documents and drawings. The Consultant shall carryout Preliminary design on approval of Concept design report and detailed design on approval of Preliminary design report.

4.1.10 Conduct Value Engineering process for selected options.

4.1.11 The Consultant shall prepare construction tender documents in accordance with the final approved detail design. The tender processes include tender clarification, technical and financial tender evaluation in accordance with Employer requirements.

4.1.12 The proposed trunk sewer network within the project area will be deep sewers more than 6m invert depth which will be installed through micro tunnelling technique. The project location plan and alignment plan attached to this report as Drawing Nos C829-DD-FS-1101 & 1102. (refer clause 3.1.2 of this document)

5 CONSULTANCY SERVICE DELIVERABLES

5.1 DESIGN TEAM CRITERIA

5.1.1 The Consultant is referred to Clause 2 of Part 1 of the Project Brief for terms and conditions relating to the design team.

5.1.2 The Consultant must confirm that he has the range of technical staff available to meet the project requirements regardless of the design option(s) to be evaluated and designed.

5.1.3 The Consultant shall provide the following professional design team members / key staff which shall include as a minimum but not necessarily be limited to:

- Project Manager (Team Leader)
- Senior Design Engineer – (Sewerage)
- Civil Design Engineer (Sewerage)
- Structural Engineer
- Mechanical Engineer
- Electrical Engineer

5.1.4 The Consultant shall provide following specialist staff and supporting staff (Non-key staff) required for the project, which shall include as a minimum but not necessarily be limited to:

- Quantity Surveyor (or Specialist Sub-Consultant)
- Hydraulic Modeler
- Geotechnical Engineer

5.1.5 The Consultant shall also provide following support staff depending on the design requirements for the project:

- CAD Operator
- Secretary
- Support staff (document preparation & accountant works etc)

5.1.6 The team shall be led by the Project Manager who shall be a European or US Registered Chartered / Professional Engineer or equivalent with at least fifteen years demonstrable experience covering sewerage network design, pumping station design, specification and implementation of works of similar nature to that of the Project. Preferably PMP certified.

5.1.7 All other design team members shall be suitably degree qualified with professional status and with ten years' experience and minimum 2 years demonstrable relevant design experience and also currently involved/working as stated in the nature of the project.

5.1.8 The Consultant shall submit to the IA for approval an "organogram" of the project design team together with the names, qualifications and experience of the individuals therein all of which shall confirm and/or elaborate and finalise the project design team submitted with the Tender submission in accordance with the Project Brief.

5.1.9 Staff availability is of paramount importance to ensure prompt progress of the Work from the initial design stages to the Tender stage. The Consultant shall give a clear statement as to the availability of the team members at the various stages of the work all in conformity with the Project Brief. Consultant shall update his staff availability as requested by the client, any change in the staff structure should be informed to IA prior to the reallocation.

5.1.10 Consultant shall nominate a suitable qualified staff prior to the project team member on leave (minimum 7 days), the proposed staff should be informed to IA prior to the appointment.

5.1.11 The qualifications and experience of the proposed staff are paramount to the success of the project. Submit each staff duties & responsibilities of the allocated positions to the project as per the Project brief.

5.1.12 All the team members should be obtained Grade A certificate from Engineers & Consulting Offices Accrediting Committee, Qatar for design practice and the Copy of Member of Qatari Engineer's Committee Grade A Certificate shall be included/produced at the time of Tender or agreed with IA.

5.1.13 Tender submitted not meeting the above criteria should expect to be deemed non-compliant.

5.2 METHOD STATEMENT

The Consultant shall submit to IA for approval a detailed method statement, staff allocation and programme which shall confirm and/or elaborate on and finalise the Method Statement proposed in the Tender submission in accordance with the Project Brief.

5.3 QUALITY ASSURANCE

5.3.1 A Project Quality Plan (PQP) shall be submitted within two weeks of the Contract commencement date to a format approved by the IA and which shall be updated as necessary.

5.3.2 The Project Quality Plan shall include an initial Risk Register and Risk Assessments for the project which highlights the general hazards which the Consultant expects to arise through the design process.

5.3.3 The Consultant shall submit to the IA for approval an updated "organogram" of the project design team together with the names, qualifications, experience of the individuals therein all of which shall confirm and/or elaborate and finalise the project design team submitted with the Tender submission in accordance with the Project Brief.

5.4 DOCUMENTATION

5.4.1 The Consultant will be required by the IA to submit four copies of all reports, documents and drawings in hard-copy and digital format (on compact disc), in an approved format, which is compatible with the IA's computer systems.

5.4.2 All drawings (layouts, house connection drawings, investigation drawings etc.,) should be in digital format compatible with AutoCAD 2006 for Windows, and the file format shall be *.DWG, *.PDF and *.DXF files.

5.4.3 All text documents should be in digital format compatible with Word 2003 or latest version for Windows, and the font to be used is Arial text size 11.

5.4.4 All calculations (including priced BOQ, hydraulic calculations) should be in digital format compatible with Excel 2003 or latest version for Windows.

5.4.5 All other documents (manufacturer's literature, extracts from technical papers, etc.) should be converted (via scanning, etc.) into digital format compatible with the IA's computer systems (Word 2003 for Windows, .PDF files).

5.4.6 Hard copy reports shall be comb bound with hard covers with accompanying drawings either up to A3 size bound-in or A1 size folded and inserted into plastic holders or bounded.

5.4.7 Documents shall be checked and approved by appropriate persons signified as such on check sheets or boxes.

5.4.8 Tender Documents shall not indicate the name of the Consultant nor include checkers/approvers. Tender documentation (drawings & document) should be in created in proper PDF format; that can be edited later when necessary. These are to be reinstated on Contract Issue Documents.

a. DCU clearance

5.4.9 The Consultant shall submit all documentation required for DCU clearance within completion of the PSA or as requested by IA. The required documentation and format should be agreed prior to the submission with IA & EBS of PWA.

5.4.10 The minimum requirements for the DCU submission are as follows: Submit the following documents with hard and soft copies (CD's) in the agreed format. PSA document (signed document should be scanned), Engineering Report, Tender documentation (documents & drawings), Survey Reports (topographical survey, property survey etc), Site Investigation Reports (Geological investigation, Geophysical investigation etc) & standard forms etc.

b. Sewer modelling

5.4.11 The Consultant shall submit all the data utilised for modelling in digital format, in a format (eg .CSV, etc) which allows for readily importing the modelling data into other commercially available modelling software requirements should be confirmed with IA prior to submission.

5.4.12 The Consultant shall build a computerized hydraulic model of the existing system in project area along with the new trunk network. Consultant should propose suitable hydraulic model package (e.g. Sewer CAD, Info Works etc.) to IA for approval. The hydraulic model and model build report shall be supplied in hard copy and digitized formats to meet IA requirements (i.e. model submission to IA shall be formulated using Info Works software). Both input data and output data (results) shall be clearly defined so that future modifications and/or additions can be made to the model. The consultant needs to follow hydraulic modelling protocols for the delivery of the models.

5.4.13 The Consultant shall submit the flow simulation for the ultimate Build out or year 2060 or as advised by IA, with different scenarios such as change in land use, increase in population density etc.

5.4.14 The Consultant shall carryout design using the following software packages or equivalent.

- Hydraulic design using SewerCAD
- Hydraulic model and model build report using InfoWorks

5.5 PROGRESS REPORTING AND REVIEW MEETINGS

5.5.1 Progress reporting of the Project shall be submitted on a monthly or other agreed basis including summarising on the Design Services Progress Report. The report will include summary of the project progress, addendum, change in scope of work, updated progress Vs baseline schedule, milestone schedule, critical activities, completed activities up to the end of month, activities in progress for the next month, identify the progress (delay etc,.), updated project staffing, schedule of payments, site photos, summary of meetings held with in PWA & other authorities.

5.5.2 The Consultant shall arrange for Project progress and review meetings to be held at 2 to 3 weekly intervals or as otherwise requested by the IA. Meeting objectives will include detailed review of progress, highlighting problem areas, review of technical issues, financial status, performance and identifying any corrective measures.

5.5.3 The Consultant shall be responsible for preparing the draft notes of meetings and shall submit the same to the IA within 48 hours of holding the meeting. Any comments from the IA shall be incorporated and the final notes of meeting submitted within 24 hours of receiving the IA comments.

5.6 PROJECT TITLING AND NUMBERING

5.6.1 Tender Documentation shall be titled and numbered as per IA requirements prior to preparation of Final Tender Documents.

Project Number	Title	Project Code
IA 14/15 D 014 I	Tender Document for Construction of Interceptor Sewer – Extension to IDRIS in Qatar South	C 829

5.7 PRESENTATIONS

5.7.1 The first presentation shall be arranged within one month of signing the contract presentation and shall include but not be limited to an overview of the project, objectives, scope of the contract, company profile, introduction of design team members etc,.

5.7.2 After and before completion of each stage (or as agreed by IA), the Consultant shall give a presentation. This presentation should include but not be limited to an overview of the project, objectives and scope of the study, options, costs, modelling results (simulation) and recommendations.

5.7.3 The presentation will be attended by personnel from O&M, Projects, and Design Departments of the PWA Engineers (Infrastructure Affairs, Assets Affairs) and other representatives

5.7.4 The presentation shall be undertaken by the Consultant as part of the services of the PSA, and the costs would be borne by the Consultant and included within the fees for the Design Services.

6 PSA "SCHEDULE A" TABLE OF SERVICES

The scope of services required shall be in accordance with Clauses 2.0, 3.0, 6.0, 7.0, 8.0 and 10.0 of Section 10 of the Professional Service Agreement General Conditions of Engagement 2010 (Revision A) of which all shall apply in full unless specifically omitted or replaced and which may be further supplemented and added to by the Project Brief. All relevant notices or circulars issued by Public Works Authority shall be taken into account.

The scope of professional services agreement (PSA) under this contract comprises four milestones namely: 1) Milestone 1: Investigation and Concept Design Stage 2) Preliminary Design Stage 3) Detail Design Stage 4) Tender Services stage for the Project area but not limited to the following:

6.1 CONCEPT DESIGN STAGE (INCLUDING INVESTIGATION)

(a) INVESTIGATIONS

6.1.1 The Investigations Stage shall incorporate all the requirements of Clause 2.0 of Section 10 of the PSA General Conditions of Engagement 2010 (Revision A) including but not limited to the following additions and/or amendments.

The scope of works under Investigation stage is the following:

a) Study of existing gravity sewer system in the project area
b) Collection of data and reports relevant to project
c) Topographic survey, Geotechnical Investigations, Groundwater Investigations
d) Utility survey and pipe ROW survey
e) Assessment of existing pumping stations & PTPs

6.1.2 Details of any available site investigation works carried out within the Project Area or adjacent areas will be referred to IA. The Consultant shall determine whether such information is adequate for design and tendering purposes.

6.1.3 The Consultant shall carry out site investigation works, in particular to report on ground water and infilling extents, if required.

6.1.4 The Consultant shall carry out Geotechnical and Geophysical Site Investigation works to report on groundwater conditions, excavation difficulties, potential cavities and any poorly-compacted or soil-active areas, if required.

- The Consultant shall propose and implement geophysical site investigation works to report on geological strata, cavities, weak zones and other changes in soil / rock conditions which could impact on micro-tunnelling methods & equipment (i.e. conditions up to 20m below ground).
- Seismic Wave Imaging survey covering about 5 km for the micro-tunnel routes.
- Electrical Resistivity (Tomography) Imaging survey covering about 5 km for the micro-tunnel routes.

In all cases, the equipment used and the layout and spacing of recording devices shall be sufficient to reveal the nature, extent and depth of any adverse rock conditions for the proposed micro-tunneling works.

Infrastructure Affairs reserves the right to modify the number or depth of boreholes drilled in which case fees for this part of the Investigation works shall be paid “pro-rata” to the number/depth of boreholes drilled.

6.1.5 Should other substantial or unforeseen specialist site investigations and survey works be deemed necessary to support the establishment of the Project Scope of Work as outlined in the Project Brief, then such works shall be executed through IA Work Orders placed with appropriately qualified contractor(s) selected from tenders/quotations submitted.

6.1.6 The Consultant shall include in his Tender (Section G Pricing Schedule) the total fees required by him for the preparation of (other than listed in clause 6.1.3: additional Site Investigation works) tender documents, commissioning and supervising investigation works and preparing the reports. The works shall only be carried out by the Consultant on written instruction from the Client.

(b) CONCEPT DESIGN

6.1.7 The Concept report shall incorporate all the requirements of Clause 1.0 of Section 10 including but not limited to the following additions and/or amendments and shall establish the feasibility of the proposed works.

6.1.8 The concept design report has to be prepared based on the outcomes of investigation and the scope of works includes the following:

- Developing proposed project options
  i. For new gravity trunk sewer network (with at least 5 options); and
  ii. Assessment of existing networks, PTPs and Pumping Stations
- Technical evaluation, project cost estimate and life cycle analysis of the proposed options
- Evaluation of proposed options and recommendations.
- Risk identification and analysis and Risk mitigation measures

6.1.9 The outline design formulated in the Master Plan, Land use plan and other reports shall also be referred to during Concept Design and prepare Tender Document for Construction Contract Services to the extent defined in the Project Brief and Schedules.

6.1.10 Concept Design Services are to include a review of the IA design criteria, design philosophy, construction practicalities, etc. to be adopted for the concept design proposals is to be submitted. This draft reporting is to be consolidated into the Concept Design Report.

Deliverables of Milestone 1:

6.1.11 Investigation Report: The investigation report shall include a) Review of available data b) data collection and survey c) study of existing gravity sewer system and d) condition assessment report for packaged treatment plants and pumping stations.

6.1.12 Concept design report: The concept design report shall be prepared based on site investigation report. The report shall include at least five alignment options for gravity trunk sewer network. It shall include risk identification and analysis, risk mitigation planning, monitoring and control.

6.1.13 The following is to be considered during the Concept design stage:-

(1) Summary of the available records and data collection from concerned Authorities including information that is outstanding, unavailable, contradictory or additional requirements as appropriate and as agreed with IA to the scope of services and deliverables.

(2) Synopsis of the existing situation with details shown on A1 drawing(s) to 1:5000 or other approved scale.

(3) Report on liaison with all relevant authorities including AA O&M and STS Sections and other Consultants. (refer stakeholder information as per clause 3.2.10 of the project brief)

(4) The Consultant shall produce combined utilities (electricity, water, telecommunications, etc.) drawings as per Item 3.2.4.

(5) Review and update the design philosophy and criteria established in the Master Plan to confirm and / or propose the philosophy and criteria that will be adopted for the design of sewerage facilities. Propose key Health and Safety features to be incorporated.

(6) Review and update sewerage system recommended by the Mater Plan for the work scope based on the Implementation Phases proposed in Project Brief. Proposals shall reflect the application of the criteria and philosophies etc. adopted from (5) above to the project area. Establish sewer routings as per Project Brief requirements and connection provisions for all trunk sewers of the complete catchment area. Present trunk sewerage routing options with cost estimates giving advantages and disadvantages of each option with respect to costs, operation, maintenance, and

construction requirements. Report on the suitability of constructing (as per project brief) proposed sewerage in roads to be utilised.

(7) Review of Land use plan, Development Plans, existing and future services to the extent available at the finalization of concept design.

(8) Layout plans of proposals indicating extent of developments, existing and proposed major services impacting design proposals, contours, critical sewer lines and road schemes which may affect the proposals presented on appropriate scale drawing(s).

(9) Investigation surveys - Undertake spot level surveys, pumping stations and rising main survey as required. Condition assessment surveys of PTPs and pumping stations including PS 52, PS 53, PS 54, PS 50, PS-IA02, PS-IA01, Labour city pumping station, Barwa Housing PTP, Karwa PTP, Al Baraha PTP, IA-STW, etc

(10) Also Identify any further investigations are required like topographical survey, & Geotechnical /Geophysical survey

(11) Preliminary calculations for agreed critical points on the sewerage system to show sewer diameter, gradient, construction depth, hydraulic properties and capacity sufficient to demonstrate that flows from packaged treatment plants and pumping station can gravitate to proposed new trunk sewers. This should be undertaken for both the short-term (existing and proposed developments) and long-term (100% fully developed) with a flow estimation and projections for every 5 year interval in agreement with IA.

(12) The scope of work recommendations will be subject to approval by IA in writing before proceeding with finalising concept design and reporting.

(13) Finalise sewerage plans with coordinate grid and based on updated scale drawings and other drawings at appropriate scales for the agreed work scope showing, as appropriate:

(14) Existing ground, proposed grading and road levels.

(15) Proposed trunk sewers and manholes / shafts, and other major services critical to the design.

(16) Sewer crossing locations with reference to Expressways and Q-Rail projects.

(17) Key plan(s) at appropriate scale with coordinates grid showing existing and proposed sewer lines, key manholes, detailed design area boundaries and existing ground contours and levels.

(18) Prepare budget estimate (summary of cost estimates) for the construction works for the entire project area.

(19) Utilise available road information from Roads Affairs projects.

(20) Consultant’s assessment and evaluation of adequacy and accuracy of the data collected.

(21) Developing design criteria and deviations from Ashghal standards and specifications

(22) Executive summary

(23) Any other detail which the Consultant would like to include in the report.

6.1.14 Obtain approval from IA in writing before proceeding to preliminary design stage.

The Consultant shall submit two CDs containing a digital copy of the draft Concept Design followed by Concept Design Report incorporating all comments from PWA which shall be in the following format.

Report	Number of copies	CD's	Format of report	Drawing size
Investigation report	2 copies	2	A4	A1
Concept Design Report	2 copies	2	A4	A1

6.2 PRELIMINARY DESIGN STAGE

The Preliminary Design Stage shall incorporate all the requirements of Clause 6.0 of Section 10 of the PSA General Conditions of Engagement 2010 (Revision A) including but not limited to the following additions and/or amendments:

6.2.1 The preliminary design stage is under Milestone 2 and the scope of works includes the following:

Upon submitting and final approval of the conceptual study, the Consultant shall carryout preliminary design for the approved option/s. Two options are to be developed with details and best suitable option is to be derived based on technical, economic, constructability, operational flexibility and safety aspects. Specific activities include completion of all field investigation woks (topographical survey, geotechnical investigation, environmental impact assessment scope report and other field investigations as necessary), hydraulic analysis and modelling, engineering analysis, customer connection survey (PSs, PTPs & Other existing / new developments to be strategically connected to the proposed trunk sewer network), development of more detailed project costs, risk analysis, value engineering and peer review. The design has to be prepared to the extent necessary to produce an estimate within ± 15 percent. The preliminary design shall include detailed layouts, cost estimate and life cycle cost model. The application for environmental approval will be based on the preliminary design.

The Consultant shall make a formal presentation to the Employer on draft Preliminary Design Report (PDR) and obtain comments from the Employer on the draft Preliminary Design Report. The Consultant shall address IA comments and produce final Preliminary design report. The Employer reserves the right to ask the Consultant to arrange for a design review workshop on final preliminary design report, if required. The Consultant shall carryout detailed design in accordance with the final approved preliminary design report.

6.2.2 The deliverables of Milestone 2 are the following:

- Executive Summary
- Updated Project schedule
- Assumptions and design criteria specific to the project
- Interpretations of geotechnical investigation report and its impact on the design
- Layout plans of sewer network
- Hydraulic calculation for gravity network
- Environmental impact assessment – scoping report
- Detailed cost estimate within ± 15 percent accuracy including break up details for various project components
- Risk analysis and mitigation measures
- Constructability and safety aspects are to be considered in the design
- Contingency plans
- Financial analysis for selecting the best contracting strategy for the project implementation.

- All permits and approvals from concerned authorities
- Land acquisition / application for ROW
- Schematic diagram illustrating overall project / project components including existing, proposed and integrated networks
- Employer's comments on previous reports and compliance statement
- Any other details which the Consultant would like to include in the report
- Stake holder – Communication - update

6.2.3 Prepare Preliminary Design and Drawings for the approved option of alignment as per the Concept Design Report. The drawings shall comprise but not be limited to the following:

(1) Location Plan, and setting out plan to appropriate scale. Key plan of Trunk Sewerage network with project boundary and sheet reference.

(2) Plans of existing and proposed new trunk sewerage network based on 1:1000 action plan survey sheets using Drainage Affairs Standard Symbols for foul sewerage. Show connection and interconnection requirements as appropriate.

(3) Hydraulic calculations tabulated to include design flows, diameters, construction depths, hydraulic properties and velocity and depth at design flow for each trunk sewer length using an approved manhole numbering system. Report on short-term and ultimate flows in respect of utilization proportions and maintenance.

(4) Layout Drawings of sewer network with details of manhole numbers, ground and invert elevations, depth, sewer diameter, length and slope details.

(5) Locations of manholes, shafts, chambers etc. Manholes shall be positioned to suit connection and operational requirements and installed to the utility hierarchy in roads.

(6) Assessment of existing packaged treatment plants and pumping station including the information on the terminal manholes and the possibility of gravitating the flows from the existing networks to this new network

Sewer Route approval

6.2.4 Obtain route approval from all concerned departments/ministries prior to completion of preliminary design.

6.2.5 Civil Engineering works and Quantities shall be measured generally in accordance with CESMM3.

6.2.6 Submit cost estimates in the form of a priced BOQ for the construction works with preliminary design.

6.2.7 Detailed Cost Estimates shall be within 15% accuracy including break up details for various project components.

6.2.8 The Preliminary Design Report shall be submitted in as follows;

Preliminary Design Report (A4 / A3)	Drawings (A1 /or A3)	CD's
2	2	2

6.2.9 Obtain approval from IA in writing before carrying out any further services in connection with Project.

6.3 DETAILED DESIGN STAGE

The Detailed Design Stage shall incorporate all the requirements of Clause 6.0 of Section 10 of the PSA General Conditions of Engagement 2010 (Revision A) including but not limited to the following additions and/or amendments:

6.3.1 The detailed design stage is under Milestone 3 and the scope of works includes the following:

The Consultant shall commence Detail design upon approval of Preliminary design and the Detail design shall include but not limited to:

i. Detailed engineering analysis of new trunk sewerage system for the project area supported with necessary design calculations that shall include complete set of drawings and construction documents complying with the Employers requirements.

ii. The specific activities include final hydraulic modelling, development of construction plan and profiles, structural design and drawings, specifications, BOQs and cost estimate.

iii. Key plan for longitudinal sections showing longitudinal section line and sheet reference.

iv. Longitudinal profiles of sewers shall be prepared to a horizontal scale of 1:000 and a vertical scale of 1:100 or 1:200 as appropriate.

v. Layout Drawings of sewer network with horizontal and vertical profiles.

vi. It is the responsibility of the consultant to complete all necessary design and obtain approval from the authorities/Stakeholders.

vii. The report shall also detail out the provision of interface with existing PTPs and Pumping station works.

viii. Traffic Management Plan (TMP) and Environmental Management Plan (EMP) is an integral part of this design.

ix. Concurrently during this stage, the consultant shall prepare cost estimates, tender documents for the works as per PWA standards.

x. The tender documents shall be accompanied with tender drawings and works specifications. Hydraulic models are to be developed with full built out condition as per 2060 or full buildout scenario.

xi. The Consultant shall submit the draft Final design report to the Employer for review and comments.

xii. The Consultant shall address all comments and produce a final design report as per the Employer requirements.

xiii. The Employer reserves the right to ask the Consultant to arrange for a design review workshop as required to discuss final design report.

xiv. The Employer reserves the right to request any documents, discussion, meeting, presentation, etc., as deemed required to be supplied by the Consultant at no additional cost.

xv. The detail design stage also includes preparation of tender documents for construction of the above project as per the approved design.

xvi. The Consultant is responsible for preparing and obtaining any data, permits, approvals deemed necessary to float the construction tender.

xvii. The Consultant shall prepare quality documents that minimize tender queries and avoid the need for extension of tender period.

xviii. The Consultant shall respond to tender queries on time during the tendering period in accordance with Employer regulations.

xix. Upon the closing date of tender and after receiving tenderers offers, the Consultant shall conduct tender evaluation and appraisal for the Tenderers in accordance with Employer's regulations and requirements.

6.3.2 The deliverables of Milestone 3 are the following:

- Executive summary update
- Detailed design report for the selected option/s.
- Updated project schedule
- All permits and approvals from concerned authorities.
- Employer's comments on previous reports and compliance of the same.
- Final update of risk analysis and mitigation plan
- Detailed Engineers cost estimate with break up details for various project components within 10% accuracy including methodology of cost estimate and evidence of accuracy based on latest CESMM system.
- Schematic diagram showing existing proposed and integrated networks.
- Traffic Management and Environmental management plan.
- Colour key plan drawing that covers the whole project area with an appropriate scale showing the routes and direction of sewer network
- Sewer network plans showing manholes, sewer name, sewer diameter, sewer materials etc. complete
- Sewer profile showing manhole number, ground level, invert level, pipe slope, pipe material, ground structures, branch connections and any other necessary information.
- Traffic Management Plan(TMP) and Environment Management Plan (EMP)
- Updated report on Assessment of existing packaged treatment plants and pumping station including the information on the terminal manholes and the possibility of gravitating the flows from the existing networks to this new network.
- Model Build Report (MBR) considering full build out scenario.
- Combined Utility coordination drawings for the sewer pipeline ROW.
- Draft Tender documents for Construction Contract
- Final Tender document for Construction Contract
- Other relevant documents/ details that are considered appropriate by the employer to the consultant to be submitted to IA.
- Conclusions and recommendations
- Draft tender documents including cost estimates and tender drawings
- Closeout report to the design work.

6.3.3 Prepare Detailed Design and Drawings for the approved option of alignment for constructing the Works for the Contracts identified in the Preliminary Design Report. The drawings shall comprise but not be limited to the following:

(1) Location Plan, and setting out plan to appropriate scale. Key plan of Trunk Sewerage network with project boundary and sheet reference.

(2) Plans of existing and proposed new trunk sewerage network based on 1:1000 action plan survey sheets using Drainage Affairs Standard Symbols for foul sewerage. Show connection and interconnection requirements as appropriate.

(3) Key plan for longitudinal sections showing longitudinal section line and sheet reference.

(4) Final hydraulic calculations tabulated to include design flows, diameters, construction depths, hydraulic properties, velocity and depth at design flow for each trunk sewer length using an approved manhole numbering system. Report on short-term and ultimate flows in respect of utilization proportions and maintenance.

(5) Longitudinal profiles of sewers shall be prepared to a horizontal scale of 1:000 and a vertical scale of 1:100 or 1:200 as appropriate. Avoid any clashes with existing and proposed services.

(6) Details of manholes, shafts, chambers, pipe bedding and protection etc. Manholes shall be positioned to suit connection and operational requirements and installed to the utility hierarchy in roads.

(7) Structural drawing showing reinforcement details, bedding details, shaft / manhole details etc.

(8) Assessment of existing packaged treatment plants and pumping station including the information on the terminal manholes and the possibility of gravitating the flows from the existing networks to this new network. This information shall be in the detailed design report for future use by IA. This information will not be part of the construction scope which will result with this contract.

(9) Flushing arrangement in case of low velocity concerns (lack of self-cleansing velocity) in the network in early days of operation

6.3.4 Specifications shall be in accordance with Qatar Construction Specification (QCS 2014).

6.3.5 Civil Engineering works and Quantities shall be measured generally in accordance with latest CESMM3.

6.3.6 Submit detailed cost estimates in the form of a priced BOQ for the construction works associated with the Detail Design.

6.3.7 The Consultant shall submit three copies of the draft Tender Documents including drawings for PWA approval.

6.3.8 Collect together all information which will be available for Tenderers to review during the Tender Period and deliver as a file system to IA prior to Tender Invitations. The information to be provided shall be agreed with IA and should include, but not be limited to, the following:

(1) Existing services information passed to the Consultant as a result of Design Enquiry's or other enquiries during the design period.

(2) Geotechnical Information from investigations undertaken for this Project for inclusion in the Tender Documentation as agreed.

(3) Record Drawings of existing installations affected by the proposed works.

(4) Construction Drawings of installations under construction which may be affected by the proposed works.

6.3.9 The Detail Design Report shall be submitted in draft format prior to submitting the draft tender documents.

Detail Design Report (Draft)	Drawings (A1/or A3)	CD's
2	2	2

Detailed Design Report

6.3.10 Submit the Final Detailed Design Report as per the required structure as detailed below. The report shall adequately describe the works for which detail design has been carried out. It shall be divided into sections relating to the design criteria, hydraulics, and sewerage as appropriate. Calculations should be included in an Appendix. Drawings shall be reduced to A3 size and bound (or agreed). The general contents of the report are detailed as follows:

6.3.11 The “Final Detailed Design Report” is required as a record covering the objectives and basis for all design work.

6.3.12 The “Final Detailed Design Report” shall summarize all data, design criteria, calculations and layout plans used during the project design to the extent necessary to form a complete understanding of the basis for all design work.

6.3.13 The “Final Detailed Design Report” shall describe all design options, their relative merits & limitations and the preferred option taken to the detail design stage. The report shall also provide details of all relevant tender drawings and documentation.

6.3.14 Report Structure

The “Final Detailed Design Report” shall be structured as follows:

- Executive summary
- Introduction
  - project objectives
  - design requirements (original PSA)
  - design changes (Addendums)
- Design Criteria
  - design standards
  - design parameters
- Design Data & Evaluation
  - existing data
  - new data (additional surveys, tests, etc)
  - assembled data (catchment plan, sewer routes, pumping stations, etc)
  - limitations, assumptions
- Specialist Studies
  - environmental studies
  - geotechnical surveys
  - hydraulic model studies
  - utility survey and pipe ROW survey
- Specialist Requirements
  - risk analysis and mitigation plans
  - health & safety
  - environment
  - traffic management plan
  - mechanical / electrical
  - assessment of pumping stations
- Design Options
  - design options
  - option evaluation (merits & limitations)
  - preferred option & phasing
  - risk analysis for all alternatives
  - costs analysis for all alternatives
  - conclusions and recommendations

- Design Details

  - hydraulic design of trunk sewers
  - drawings
  - documentation
  - compliance with engineering comments

- Appendices

  Details of environmental studies, geotechnical surveys, hydraulic model studies, condition assessment of pacakaged treatment plants, pumping stations, etc.

6.3.15 Content of Detailed Design Report

The "Final Detailed Design Report" shall contain all information as outlined above. Drawings shall be prepared on Auto CAD, reduced to A3 size and bound within the report or bound as a separate volume.

Further details involving the Final Detailed Design Report content are as follows:

Plans	Drawings showing sewer alignment options, road hierarchies, structures and associated works, etc to appropriate scales. Where refurbishment, replacement and/or extension works are to be carried out, details shall clearly identify existing and new works.
Sections	Sections of pipelines at appropriate horizontal and 1:100 or 1:200 vertical scales. Sections to include Chainage, connecting structures, manholes/chambers, invert, cover and ground levels, bedding type, pipeline diameter and material, gradient, terrain crossed, major service crossings and connecting pipeline details.
Detailed Drawings	Detailed drawings to approved scales for shafts, chambers, manholes, etc. The limit and extent of the works undertaken under the Project shall be clearly identified together with existing and new works.
Environmental Studies	A full description of all environmental studies, findings and recommendations regarding the environmental setting in the project area.
Geotechnical Information	A summary of all geotechnical information and key parameters used in the project design work together and locality plan with coordinates showing the location of relevant boreholes and test pits.
Hydraulic Model Studies	Description & illustration of the hydraulic model studies to cover existing and fully developed conditions for trunk sewer (project area). Report to include listings (with appropriate explanations) of all input & output data files.
Environmental Impact statement	The Report shall assess the possible environmental impacts of the design, construction & operations stages of the project works. It shall outline both the positive & negative impacts of the design proposals and any mitigating measures that may be required especially regarding discharges to the outfalls.
Health and Safety	The Report shall contain a summary of health and safety measures adopted to meet fundamental safety requirements with respect to construction, refurbishment, operation and maintenance of the design works covered under

	this PSA.
Traffic Management Plan	The Traffic Management Plan shall define traffic flows and road conditions. It shall describe measures to control & minimize traffic disruption during the construction period (phasing, duration & extent of road / lane closures). It shall outline the penalties for non-compliance.
M&E Equipment	Schedule of all items of M&E equipment and instrumentation control and automation (ICA) as appropriate. Where the new equipment is incorporated with existing equipment, details shall also show existing machinery and apparatus. A basic P&I diagram indicating the method of control and layout of the proposed instrumentation. The diagram shall incorporate existing equipment where necessary to illustrate the complete system.
Structural Design	Structural calculations with reinforcement drawings and bar bending schedules shall be prepared for structures, shafts, chambers, manholes, etc. that are to be modified.

6.3.16 The Final Detailed Design Report shall be submitted prior to submitting the draft tender documents. The Consultant shall submit two CDs containing a digital copy of the Final Detailed Design Report in addition to the documentation which shall be in the following format

Final Detailed Design Report	Drawings (A1/or A3)	CDs
3	3	3

6.3.17 Obtain approval from IA in writing before carrying out any further services in connection with the Project.

6.4 TENDER STAGE

The Tender Stage shall incorporate all the requirements of Clause 7.0 of Section 10 of the PSA General Conditions of Engagement 2010 (Revision A); including but not limited to the following additions and/or amendments.

6.4.1 The Tender Stage is under Milestone 4 and the scope of work includes the following:

The Consultant shall prepare the required Tender documents according to the contract as a result of value engineering / management workshop or as a result of further modifications at preliminary and detail design stages. The Tender stage shall include preparing construction tender documents in accordance with the final approved detailed design. The Consultant shall arrange for all tendering process requirements including responding to tenderers clarification during tendering period, technical and commercial evaluation in accordance with Employer requirements within the time frame stipulated in the Form of Tender.

The Consultant shall include the following services but not limited to:

- Prepare draft tender document(s) and submit for IA's review and conduct tender preparation workshop(s) with IA after two weeks of submission.
- Finalize the tender documents incorporating the review comments and amend the tender document(s) as required.
- Prepare and discuss tender evaluation criteria and obtain approval from the Employer on the same.
- Answer tender queries in consultation with IA
- Organize and conduct site visit with the Tenderers during the tendering period.

- Evaluate tender offers, freeze all technical and commercial deviations of bidders (apple to apple approach) before price opening, prepare tender evaluation report(s), review with IA and formally present tender evaluation report and recommendations to the IA.
- Prepare and submit Contract documents after award of the contractor(s).
- Performing all IA requests and requirements as required.
- Project close out (DCU)

6.4.2 The deliverable of milestone 4 are the following:

- Tender Invitation
- Tender clarification
- Tender evaluation – Technical and commercial
- Award of Construction Contract and
- Project close out (DCU)

6.4.3 The Consultant shall prepare the following number of copies of the Tender Documents and Drawings in the approved format, and deliver to the Engineer:

6.4.4 Provide Tender Document (all Volumes) and Drawings in reduced A3 format bound in the A4 hard folder.

Tender Documents	Tender Drawings (A3)	CDs
5	5	20

6.4.5 Provide four copies of the Tender Evaluation Report.

Document	Number	CDs
Tender Report	4	2

6.5 ESTIMATE

The Estimate Stage shall incorporate all the requirements of Clauses 8.0 of Section 10 including but not limited to the following additions and/or amendments:

6.5.1 Submit detailed cost estimate in the form of a priced Bill of Quantities (as per Clause 6.3.6 above) at completion of the Detail Design Stage.

6.5.2 Provide two copies of the cost estimate.

Document	Number
Cost Estimate	4

6.6 CONTRACT STAGE

The Contract Stage shall incorporate all the requirements of Clause 10.0 of Section 10 of the PSA General Conditions of Engagement 2010 (Revision A) including but not limited to the following additions and/or amendments:

6.6.1 Prepare thirteen copies of the Contract Document for signature and 5 sets of signed Contract Documents.

6.6.2 Prepare six sets of the Drawings marked as “Construction Issue” and distribute as instructed by the Engineer.

Document	Drawings	Number	CDs
Contract Document (for signature)	6	13	2
Signed Contract Document		5	2

6.6.3 DCU clearance

The Consultant shall submit all documentation required for DCU clearance as per the Project brief clause 5.4.9 & 5.4.10.

6.7 HEALTH AND SAFETY

During the preparation of design work consultants shall consider the potential effect of the design on the health and safety of those carrying out the construction work and others affected by the project as a whole.

The risks to be considered include risks to those building, maintaining, operating, repairing or demolishing the facility in addition to those who may be affected by the works i.e. members of the public.

6.7.1 Consultants shall prepare a Risk Register for the project which shall be updated and maintained as design work progresses. The Risk Register shall be submitted to the Client as an Appendix to the monthly progress reports and shall also be bound into each of the Design Stage Reports as an Appendix together with copies of all Designers Risk Assessments.

6.7.2 Consultants shall demonstrate in their design reports that the Health and Safety risks have been considered fully and in accordance with the following procedure:

(1) Identify the significant health and safety hazards likely to be associated with the design and how it may be constructed, operated, maintained and demolished.

(2) Consider the risk from the hazards which arise as a result of the design being incorporated into the project by preparation of a Risk Assessment for each hazard.

(3) Alter the design to avoid or reduce the risk.

(4) Update the Risk Register to reflect the reduction or removal of the hazard.

6.7.3 When considering health and safety in the design, consultants shall consider what is reasonably practicable i.e. the risk to health and safety produced by a feature of the design has to be considered against the cost of excluding the feature. Cost should not be considered only on financial grounds but must include aesthetics, build ability and environmental impact.

6.7.4 Within the design stage submission(s) the consultant shall state any Design Assumptions made which could affect health and safety including a statement of the assumptions regarding precautions for dealing with risks.

6.7.5 On completion of the design work, consultants shall submit information with the design package(s) which clearly identifies all risks which remain, in order to alert others of the risks

which they cannot reasonably be expected to know. This information shall be utilised by contractors and operators through the lifetime of the facility. The Risk Register and Design Assumptions shall form part of this submission.

6.7.6 Consultants shall provide with their Tender Submission a method statement outlining their procedures for undertaking Design Risk Assessments.

6.8 PROJECT MANAGEMENT PLAN (PMP)

The Consultant will be responsible for the project management to ensure the delivery of the project on time, budget and quality to the entire satisfaction of the Employer. The Consultant shall provide a Project Management Plan (PMP) as per the Project Management Institute's "Project Management Body of Knowledge (PMBOK) Fifth edition from the early stage of the project till the project closure. The Consultant shall be responsible for the update of the project management plan over the project life cycle.

The Consultant shall submit a draft PMP at the concept design stage and update at regular intervals. The PMP shall be made available on demand by the employer at any time during the project life cycle.

The Consultant shall initiate and maintain log of "Lessons Learned" with sufficient details over the project life cycle and report shall be submitted to the employer every month. The Consultant shall submit a comprehensive report of such logs for the Employer exclusive use upon completion of the project.

The Consultant shall submit on closure of the contract the final PMP in soft and hard copy up to the Employer's satisfaction.