

PART 1 PRELIMINARY STAGE DESIGN PROFESSIONAL SERVICES

1.01 WORK INCLUDED

- A. The Consultant shall perform required field engineering, design and permitting services and submit for review such design progress submittals as are required by this specification section. The Consultant shall submit Draft and Final Basis of Design Reports and 60% design submittals.
- B. The Consultant shall plan the design steps, meetings, studies, review requirements and permitting requirements to meet the agreed upon project schedule while providing the Buffalo Sewer Authority (BSA) with sufficient opportunities to review and interact with the Consultant's Design Team and discuss design progress.
- C. The Consultant shall validate the information and concepts contained in the Preliminary Engineering Reports (PER) and 30% designs included with the RFP. The Consultant shall develop a design which is consistent with the concepts developed in the referenced documents and with required regulatory agencies, and which will produce efficient and reliable Construction Drawings and Construction Specifications that are approvable by the Owner and applicable New York State (NYS) agencies, including the Department of Environmental Conservation (DEC) and Environmental Facilities Corporation (EFC).
- D. The Consultant shall prepare detailed plans, sections, details, and profiles of the proposed facilities. The Consultant shall develop Construction Specifications in Construction Specifications Institute (CSI) MasterFormat 2004 (6 digit). Construction Specifications shall contain sufficient information for construction, equipment attributes and material quality, equipment performance and design requirements, testing parameters and requirements, training, spare part requirements, installation considerations, manufacturer's representative site visit frequency and tasks and review by BSA and its representatives, DEC and local authorities. Where appropriate, Construction Specifications will consist of data sheets, materials lists, etc. Standard Division 0 – Procurement and Contracting Requirement specifications shall be provided by BSA.
- E. The Consultant shall contact and coordinate their Work with all Project stakeholders, including but not limited to, utility companies, the City of Buffalo, and the NYS Department of Transportation (DOT) as required.
- F. The Consultant shall develop the Construction Drawings and Construction Specifications based on the design concepts contained in the PER, the 30% design and the RFP, and shall coordinate the design with DEC in order to request and obtain the necessary certificates/permits for construction and operation of the system by the stipulated dates.

1.02 GENERAL RESPONSIBILITIES OF THE CONSULTANT

- A. The Consultant shall attend monthly meetings with the BSA and the Program Manager to provide an update on the progress of the Work over the past month and expected performance and needs for the next month, receive feedback from BSA and the Program Manager, and inform the Owner of technical decisions or problems that might affect the Progress Schedule.
- B. The Project has regulatory deadlines and the Consultant shall adhere to all milestone dates established in the Project Schedule. If the Consultant falls behind schedule for reasons within the control of the Consultant, the Consultant shall commit whatever resources deemed necessary to recover the schedule at no additional cost to BSA.
- C. BSA will make available to the Consultant the existing topographic and boundary survey of the site, if available. The Consultant shall prepare all additional survey information that is necessary for the engineering design of the Project. At a minimum, the survey shall include the control traverse, topography, levels, wetlands and associated buffers, horizontal and vertical location of existing utilities, and any other site environmental site attributes, and as-built information.
- D. BSA will provide geotechnical information from the site, if available. The Consultant is required to provide additional geotechnical investigations that are required to provide a complete engineering design of the project. All coordination to complete the geotechnical investigations is the responsibility of the Consultant.
- E. The Consultant shall, in a timely manner as not to affect the Progress Schedule, apply for and acquire all permits necessary at the design phase of the project. Application to county, state and federal reviewing agencies shall be made at the appropriate times as to minimize delays in the Project due to review of permitting agencies. The Consultant shall provide sufficient detail in the preparation, submission, addressing comments and approval of any required permits and shall be made with no additional compensation.
- F. As required and when directed by BSA, the Consultant may be required to furnish governing regulatory agencies a complete set of Drawings and Specifications for their comments and approval as part of the design process. The Consultant shall revise Drawings and Specifications to comply with the regulatory agency's comments. The Consultant shall be totally responsible for obtaining all current guidelines and/or standards required by the various agencies and incorporate them into the design of the Project. All applicable permit applications shall be prepared by the Consultant.

- G. Draft and Final Basis of Design Report: The Consultant shall provide a draft Basis of Design Report at the 60% stage and a final Basis of Design Report at the 90% design stage. The Consultant shall, at a minimum, include the following in the Basis of Design Report:
1. Basic Design Data and Assumptions
 2. Existing Utilities
 3. Environmental Constraints
 4. Code, Regulatory and Permit Review
 5. Process Flow Diagram/Schematics
 6. Hydraulic Profile
 7. Site and Sewer Alignment design – Micro Tunnel
 8. Structural and Mechanical - HVAC Design
 9. Odor control design
 10. Landscape and Other Architectural Design
 11. Initial Equipment List
 12. Operation, Monitoring and Control Strategies
 13. Site Survey (refer to existing survey if no additional topographic surveys are conducted)
 14. Geotechnical Summary Report – Including Soil Borings and Locations (refer to existing report if no additional borings are conducted)
 15. Preliminary Electrical Loads and Determination if Planned Electrical Service is Adequate
 16. Criteria for Structural Foundations and Walls
 17. Power Distribution Schematic
 18. Integration Plan with Existing Facilities
 - a. SCADA
 - b. Power distribution
- H. Statement of Probable Construction Costs: At the completion of the preliminary engineering stage, the Consultant shall prepare an estimate of probable construction costs. The estimate will be broken down by CSI format.
- I. The Owner retains the option to require a value engineering (VE) review of the 60% complete design submittal.
- J. The Consultant shall submit a complete electronic PDF set of the 60% design submissions to the Program Management Team (PMT), who will distribute them for Owner review. At a minimum, the 60% complete design submission shall consist of the following:
1. Cover Sheet
 - a. Local and Vicinity Maps
 - b. General Notes
 - c. Index of Sheets
 - d. Material List
 - e. Contract Number

2. Civil
 - a. Completed Site Drawings indicating all grading and improvements
 - b. Soil Erosion and Sediment Control Plans
 - c. Boundary and Topographic Surveys
 - d. Site Utilities
 - e. Access Roads and Parking Lots
 - f. Completed Yard Piping Plans

3. Structural
 - a. Drawings with All Structural Members located, sized and detailed
 - b. Footing, Beam, Column and Connection Schedules
 - c. Final Building Elevations
 - d. Foundation Drawings
 - e. Anti-Buoyancy Measures

4. Mechanical
 - a. Flow Diagrams and Piping Plans
 - b. All Mechanical Equipment located, sized and detailed
 - c. All Applicable HVAC Facilities located, sized and detailed
 - d. Legend Showing All Symbols used on Drawings
 - e. Odor Control

5. Electrical/Instrumentation
 - a. All Power Consuming Equipment and Load Characteristics shown, sized and detailed.
 - b. Major Electrical Equipment Switchgear, Distribution Panels, Transfer Switches, etc., dimensioned and drawn to scale into the space allocated
 - c. Site Lighting Design
 - d. Lighting, Power, Telecommunications, Systems and Devices and Receptacles shown in Plan
 - e. Instrumentation Diagrams including functions
 - f. Electrical Load Estimate for Systems, Equipment, Receptacles, Lighting, etc.
 - g. Schematics for Instrumentation and Controls
 - h. Detailed Instrumentation and Process Control Diagrams including all mechanical valves, control valves, solenoid valves, and air control functions. Show pipe sizes, flow direction, pumps, etc.

6. If applicable:
 - a. Architectural Views and Elevations
 - b. Floor Plans with final room locations including all openings
 - c. Wall Sections showing final dimensional relationships, materials and component relationships
 - d. Identification of all fixed and loose equipment to be installed
 - e. Finish Schedule identifying all finishes

- f. Well-Developed Door and Hardware Schedule showing final quantity, plus type and quality levels
7. Draft Construction Specifications in CSI format
 - a. Near final equipment specifications
 - b. Near final maintenance of plant operations during Construction specification
 - c. Draft Construction Specifications for all other divisions
8. Estimate of Probable Construction Cost
9. The Consultant shall create a Risk Register including identification of the risk in the Risk Register and mitigation measures with responsibility assigned. The Consultant shall conduct a review and assessment of the impact of the design and construction of the improvements to existing operating systems including any potential spare/replacement components and including incorporating this risk into the Risk Register. The Risk Register shall be updated on a regular basis and discussed as part of the monthly progress meeting.

PART 2 FINAL DESIGN PROFESSIONAL SERVICES

- 2.01 Final design shall consist of the 90% and 100% design deliverables. The final Construction Drawings shall be stamped and signed by a registered professional engineer licensed in the State of New York.
- 2.02 The Consultant shall submit complete electronic PDF sets of the 90% and 100% design submissions to the PMT, who will distribute them for Owner review. At a minimum, the 90% and 100% complete design submission shall consist of the following:
 - A. 90% Design Phase
 1. The Consultant shall address and resolve all comments provided by the Owner on the 60% design documents.
 2. Documentation of design decisions made in design development
 3. Prepare Construction Drawings
 4. Prepare Construction Specifications (in CSI format)
 5. Update Cost Estimate
 6. Prepare for review and approval permit applications from all relevant permitting agencies

7. Update Risk Register
 8. The Consultant shall conduct a final constructability review
 9. The Consultant shall submit 90% Design Documents to the appropriate local regulatory and government agencies for review and approval of permits and/or approvals to proceed with Construction, after review of applications and approval by BSA. The Consultant shall provide all information requested by the permitting agencies to allow the agencies to provide the necessary permits.
- B. The following define the disciplines of the detailed design requirements, but are not limited to:
1. General Design: General design covers index of drawings, location and vicinity maps, design data, flow diagrams, hydraulic profile, and general conditions.
 2. Civil Design: Civil design covers, but is not limited to, the layout of the proposed facilities and associated outside piping, paving, grading and drainage, and other elements to meet local regulatory and government agencies site plan submission and approval requirements.
 3. Architectural Design: Architectural design covers the architectural features of the proposed building.
 4. Structural Design: Structural design covers the structural members and reinforcement located, sized and detailed, footing, beam, column and connection schedules, elevations, sections, foundation drawings, anti-buoyancy measures.
 5. Mechanical Design: Mechanical design consists of the selection, design, and layout of all process elements including piping, gates, valves, pumps, odor control, ventilation and or other equipment needed for the functioning system.
 6. Electrical Design: Electrical design consists of the analysis of power utility service, variable speed drive analysis, determination of power requirements, preparation of lightning and circuit diagrams, and design of electric motors and switchgear.
 7. Instrumentation and Control Design: Instrumentation and control design consists of development of specific control systems for the systems specified for the Project and development of final process and instrumentation diagrams (P&IDs) which shall show the layouts of all project systems and the relationships of systems and subsystems to one another. The diagrams serve as process summaries, design control, construction and operation aids. Control panels are designed for the instrument and display components selected and existing components modified or replaced.

- C. Permit Documents: The Consultant shall prepare and submit all necessary permit documents required for the approval of authorities having jurisdiction over the Project, and the Consultant shall coordinate the issuance of all required permits with any authorities having jurisdiction of same. The Owner shall pay all permit application and processing fees.

- D. The Consultant shall coordinate with all authorities having jurisdiction, at a minimum, but not limited to, the following agencies for the appropriate required permits:
 - 1. DEC
 - 2. EFC
 - 3. City of Buffalo or other local authority having jurisdiction
 - 4. Utilities including Water, Gas, Electric, Communications, etc.
 - 5. NYS or county DOT
 - 6. Note that additional agencies may be required.

- E. The 100% complete design submissions shall include all aspects of the 90% submission while also incorporating Owner comments on the 90% submission. Permit submittals will be replaced with a status update on the applications made based on the 90% submission.

2.03 DESIGN PROFESSIONAL SERVICES DURING CONSTRUCTION

- A. Refer to RFP Section II for requirements during construction including Construction Administration and Construction Inspection. The PMT is currently developing a detailed CM/CA/CI document that will be provided to the awarded Consultant.