PROFESSIONAL SERVICES
SUPPLEMENTAL AGREEMENT # 1
FOR
CITY OF PFLUGERVILLE WATER TREATMENT PLANT EXPANSION

STATE OF TEXAS §
§
COUNTY OF TRAVIS §

This Supplemental Agreement No. 1 to a contract for Professional Services is made by and between the City of Pflugerville, Texas ("City") and Ardurra Group, Inc. ("Consultant"). City and Consultant may be referred to herein singularly as "Party" or collectively as the "Parties."

WHEREAS, the City and Consultant executed an Agreement for Professional Services ("Agreement") on the 16th day of December 2020 for the City of Pflugerville Water Treatment Plant Expansion project ("Project") in the amount of one million nine hundred forty-seven thousand five hundred and twelve dollars ($1,947,512.00); and

WHEREAS, the City and Consultant desire to enter into a Supplemental Agreement # 1 for Professional Services for the Project in the amount of five million two hundred three thousand five hundred and twenty-nine dollars ($5,203,529.00), to add Final Design and Bidding Phase Engineering Services to the Agreement; and

WHEREAS, it has become necessary to amend the Agreement to modify the provisions for the Scope of Services, Work Schedule, and Compensation; and

WHEREAS, it is necessary for the City to amend its agreements from time to time to comply with changes in state law relating to contracts of municipalities.

NOW, THEREFORE, premises considered, the City and the Consultant agree that said Agreement is amended as follows:

l.

Article III. Scope of Services, Work Schedule and Appendix A, shall be amended as set forth in the attached addendum to Appendix A.

Article IV. Compensation to Consultant and Appendix B (Fee Schedule), shall be amended by increasing by five million two hundred three thousand five hundred and twenty-nine dollars ($5,203,529.00), the amount payable under the Agreement for a total of seven million one hundred fifty-one thousand and forty-one dollars ($7,151,041.00), as shown by the attached Addendum to Appendix B (Fee Schedule).

2.

Except as amended hereby as indicated above, the terms of the Agreement shall remain unchanged and in full force and effect.

EXECUTED and **AGREED** to as of the dates indicated below.

CITY OF PFLUGERVILLE	**CONSULTANT**
_____	_____
(Signature)	*(Signature)*
Printed Name: Sereniah Breland	Printed Name: Chris Canonico, PE
Title: City Manager	Title: Principal
Date: _____	Date: 7.8.2021

APPROVED AS TO FORM:

_____

Charles E. Zech
City Attorney
DENTON NAVARRO ROCHA BERNAL & ZECH, P.C.

SCOPE OF SERVICES
FOR

CITY OF PFLUGERVILLE
WATER TREATMENT PLANT EXPANSION
FINAL DESIGN AND BIDDING PHASE

GENERAL

The City of Pflugerville (City) operates a nominal 17 million gallon per day (MGD) Water Treatment Plant (WTP). This project is to provide a comprehensive expansion of the WTP to 30 MGD, incorporating other active CIP projects currently underway, to meet current and future water demands. This project will also construct improvements required by the WTP facility to meet and maintain regulatory compliance, safety, technology improvements, process innovation and renew aging infrastructure. The expanded WTP facilities are scheduled to be placed into operation by April 2023 to meet projected water demands.

Development of a Preliminary Engineering Design & Report was completed under the original authorization. The following scope of work clarifies and describes the project tasks to be performed and completed by the Engineer to include final design and bidding phase services.

During the development of the preliminary engineering design & report, the following components were defined for the plant expansion. The final design will be based on the scope describe below:

A. Expansion of existing Lake Raw Water Pump Station will include
   - Two new vertical turbine pumps connected to the existing suction header and discharge header. The new pumps will be constant speed with soft starters as the existing pumps have variable frequency drives (VFDs).
   - A copper ion generator system to feed copper ion solution at the lake intake tower for zebra mussel control.
   - Expanding the existing Lake Raw Water Pump Station Pre-Engineered Metal Building (PEMB), interior CMU Electrical Room, and overhead bridge crane.
   - Associated architectural, structural, building mechanical, electrical, instrumentation and control and SCADA integration improvements.

B. The Pretreatment System (i.e. Rapid Mix, Flocculation Basins, Plate Settlers) will include
   - Aluminum chlorohydrate (ACH) coagulation with static mixers, three-stage flocculation basins, and sedimentation basins with plate settlers.
   - Four trains with one static mixer to serve two trains for chemical coagulation. Sludge produced from each train will be collected via chain and flight sludge collectors and discharge into a raw sludge splitter box.

- A new PEMB canopy structure over the plate settler basins.
- A new standalone precast concrete or pre-engineered metal Pretreatment Electrical Building.
- Associated architectural, structural, building mechanical, electrical, instrumentation and control and SCADA integration improvements.

C. Membrane Filtration retrofit will include
- New membrane feed pumps & strainers, submersible membrane filtration units, permeate pumps. The new membrane equipment will be installed inside the existing basins.
- New chemical clean-in-place(CIP)/neutralization system with CIP tank, CIP feed pumps, CIP chemical storage and feed equipment, CIP waste neutralization tank and pumps, and associate piping. The CIP tank and feed pumps will be installed inside the existing Membrane Building, and CIP chemical storage tanks and waste neutralization tank and pumps will be installed outdoors.
- New backwash system with backwash pumps, air scour blowers and associated piping. The backwash pumps and blowers will be installed inside the existing Membrane Building.
- A new standalone precast concrete or pre-engineered metal Membrane Electrical Building.
- Associated architectural, structural, building mechanical, electrical, instrumentation and control and SCADA integration improvements.

D. Chlorine Contact Basin will include baffled channels and a control weir. Primary disinfection will be achieved through free chlorine. Liquid ammonium sulfate (LAS) will then be added to form chloramine for secondary disinfection prior to storage.

E. High Service Pump Station will include
- Converting the existing high service pump discharge header WYE connections to TEE connections.
- A new PEMB High Service Pump Station (HSPS No. 2) with two vertical turbine pumps and VFDs to serve the new proposed 794-foot pressure zone (via an ongoing Elevated Storage Tank project by others). The new HSPS will include an Electrical Room and overhead bridge crane.
- Associated architectural, structural, building mechanical, electrical, instrumentation and control and SCADA integration improvements.

F. Chemical Storage and Feed Facility will include
- Demolishing existing chemical system including ACH coagulant, liquid ammonium sulfate, onsite hypochlorite generation. This area will be repurposed for CIP tanks and pumps, and waste neutralization tank and pumps.
- Demolishing abandoned PAC equipment inside the PAC room; This room will be repurposed for the new membrane air scour blowers.

- A new chemical bulk storge and feed facility with outdoor bulk storage tanks to house bulk delivered sodium hypochlorite, liquid ammonium sulfate, coagulant, and individual chemical metering pump rooms inside the Chemical Building. The Chemical Building will have an Electrical Room and a Mechanical Room.
- Associated architectural, structural, building mechanical, electrical, instrumentation and control and SCADA integration improvements.

G. The Solids and Residual Liquid Handling System will include
- A new Raw Sludge Splitter Box, two new sludge Gravity Thickeners and Thickened Sludge Pump Station.
- A new Backwash Waste Clarifier and Recycle Pump Station. The recycle pump station will pump decant from the backwash clarifiers and gravity thickeners to the head of the plant.
- A new standalone precast concrete or pre-engineered metal Solids Handling Electrical Building.
- Associated architectural, structural, building mechanical, electrical, instrumentation and control and SCADA integration improvements.

H. Miscellaneous Improvements include
- Yard piping.
- Site civil including plant roads, sidewalks, site grading, drainage, and stormwater detention.
- A new 24-inch water line to connect the proposed elevated storage tank (by others) to the proposed off-site transmission line in ROW (by others), routed through the WTP site.
- New electrical distribution switchgear inside the proposed Main Electrical Building (via an ongoing Generator project by others).
- A second 2250 kW generator to support the plant expansion. One generator of the same capacity will be designed and installed under the ongoing Generator project by others.

I. No improvements are proposed for the following areas as part of this expansion phase.
- Plant Entrance Gate.
- On-site Sanitary Lift Station.
- Control Room/Offices.
- Maintenance Building.
- Plant Security System.
- Plant Electrical Service– Currently being handled under the Generator project by others.

Upon receipt of notice to proceed, Engineer shall perform final design, and prepare construction contract documents for the WTP expansion, and assist during bidding phase. Construction phase engineering services, development of O&M manual, commissioning and startup services will be included in future contract amendments and performed upon completion of the final design and bidding phase services.

Stakeholders for this contract include:

A. Ardurra and its teaming partners as "Engineer"
B. City of Pflugerville as "City"
C. Garver as "Owner's Representative (OR)"

SCOPE OF WORK

The scope of work presented below describes the basic level of services for this project by project task. Unless noted otherwise, all deliverables will be electronic PDF.

Task 1.0 – PROJECT MANAGEMENT AND QUALITY ASSURANCE

1.1. Project Management

Engineer shall oversee the delivery of the design phase for the project. This task includes the Engineer's coordination with the City staff and Owner's Representative to manage the delivery of the work outlined in this scope of work. The Engineer will perform the duties of project oversight and reporting to provide updates on the following items: project performance, schedule updates, budget tracking, monthly status reports, and project invoicing. The Engineer will meet with the City's project management team to provide updates on the project status, schedule, budget, and potential changes to the scope of work at monthly progress meetings.

Engineer will track and update the budget, schedule, progress of work, and potential changes to the scope of work. Engineer will provide a project status report and submit with monthly invoice. The project status report will include summary of work completed to date, work planned for upcoming month, and schedule update as needed.

It is assumed that City's OR will track project overall budget and submit all necessary outlay documents as required by the project funding agency.

Deliverables: Project status reports and monthly invoices

1.2. Project Progress Meetings and Calls

Engineer will conduct an initial kickoff meeting with the City/OR to review and confirm final design scope, review protocol and lines of communication, gather additional documents (if needed) pertinent to the project final design phase, and review schedule.

Monthly progress meetings will be held during the course of the project with the City staff to discuss aspects of the project tasks presently underway, review progress, project schedule, and upcoming issues. These meetings will generally be about two hours in duration. The appropriate Engineering team members shall attend the meetings to discuss pertinent issues. Up to five (5) progress meetings are planned for the final design phase of the project. Engineer will prepare draft meeting summary within seven business days to submit to the City/OR for review and approval. Final meeting summary will be issued after incorporating review comments.

Deliverables: Meeting agenda and summary

Considering this project has an accelerated schedule, up to six (6) monthly progress conference calls are planned for the final design phase of the project. These conference calls will be scheduled between the monthly progress meetings to allow more frequent communication in order to facilitate decision-making on a timely basis. The project action item and decision log will be updated as needed after each call.

Deliverables: Decision Log Update

1.3. Project Team Coordination

Engineer will conduct monthly progress & coordination meetings with design team and subconsultants to coordinate design tasks, review all project elements, to facilitate development of final design. Up to twelve (12) internal team coordination meetings are planned for the final design phase of the project, including

- Team Progress Meetings (6)
- Membrane System Coordination Meeting (all disciplines) (2)
- Electrical/Instrumentation Control and SCADA Design Coordination Meetings (2)
- Architectural/Structural/Building Mechanical Design Coordination Meetings (2)

1.4. Quality Assurance/Quality Control

Engineer will perform quality assurance/quality control procedures during the project phase. These procedures will include a technical review of interim deliverables by senior technical advisors who are not directly involved with the project. The technical review will provide comments and suggestions concerning the various project deliverables for incorporation.

The 60-percent technical review will include process and technical feasibility, constructability, discipline coordination, and plans and specification coordination. A one-day review meeting will be conducted to discuss the project and the associated technical review comments. The 90-percent technical review will include a final cross-discipline quality check for coordination and constructability.

Deliverables: Internal documentation of technical reviews and response logs

1.5. City/OR Review Meetings

Review meetings with City/OR staff will be conducted for the 60- percent and 90-percent complete plans and specifications. These meetings will be held approximately two weeks following submittal of the documents to provide time for review, and comment collection & compiling. Following their review, City/OR staff will provide written comments in a consolidated file that summarizes all comments from reviewers to Engineer. Engineer will provide written responses to these comments.

Separate meetings will be conducted for the various project disciplines so that the appropriate staff are available. It is anticipated that three separate review meetings, will be conducted at both the 60% and 90% completion, for a total of six meetings, including:

- Process Mechanical focused review (8 hours each)
- Electrical/Instrumentation Control and SCADA focused review (4 hours each)
- Architectural/Structural/Building Mechanical focused review (4 hours each)

Deliverables: 60% and 90% Review Comments Response Logs

TASK 2.0 – FINAL DESIGN AND BIDDING PHASE

2.1. 60-Percent Plans, Specifications, and OPCC

The plans, opinion of probable construction cost, and specifications for the WTP expansion will be completed to a 60-percent level and submitted to City/OR for review and comment. Engineer will use a combination of City's standard specifications (as applicable) and Ardurra's specifications that are developed for this project. Specification format will be Ardurra standard format following the CSI 16-division format. It is assumed that Division 0 Front-End Documents will be provided by the City, and Ardurra will modify to include project specifics into the Document.

As this project will be a Competitive Sealed Proposal, Ardurra will assist the OR and City in defining the selection criteria used to identify the best value bidder. It is assumed a two-hour workshop will be held between the OR, City, and Ardurra to prescribe the Competitive Sealed Proposal Process and details of selection.

The 60% review shall be defined and consist of the minimum level of completion by the following disciplines:

- General/Standard Sheets - 70%
- Process Mechanical - 70%
- Civil - 70%
- Structural - 60%
- Architectural – 60%
- HVAC and Plumbing – 50%
- Instrumentation & Control - 75%
- Electrical - 50%
- Specifications - 40%
- Cost Estimate - 60%

Deliverables: Electronic PDF of 60% plans and specifications;
60% opinion of probable construction cost (OPCC)

2.2. 90-Percent Plans, Specifications, and OPCC

The plans and specifications for the WTP Expansion will be completed to a 90-percent level and submitted to City/OR for review and comment. The 90% review shall be defined and consist of the minimum level of completion by the following disciplines.

- General/Standard Sheets - 95%
- Process Mechanical - 95%
- Civil - 95%
- Structural - 90%
- Architectural – 90%

- HVAC and Plumbing – 90%
- Instrumentation & Control - 95%
- Electrical - 90%
- Specifications - 90%
- Cost Estimate - 90%

Deliverables: Electronic PDF of 90% plans and specifications;
90% opinion of probable construction cost (OPCC)

2.3. Coordination with TCEQ and Texas Department of Licensing and Regulation (TDLR)

Engineer will review and submit documents to be in compliance with Texas Commission on Environmental Quality (TCEQ) rules and regulations. Engineer will submit 95-percent complete plans and specifications to TCEQ for review. Upon receipt of plan review comments, Engineer will respond in writing and make necessary changes to the contract documents and resubmit a 100-percent set of signed and sealed bid documents.

This task also includes miscellaneous design coordination that will be made with TCEQ over the course of the design phase. It is anticipated that up to two (2) virtual meetings will be conducted with TCEQ regarding the project. Each meeting is anticipated to be one hour in length.

Deliverables: Two hard copies (plans and specifications) to TCEQ for review and response letter to address comments

Engineer will include necessary provisions within the WTP Expansion design to be compliant with accessibility per the TDLR. Engineer will obtain the services of Registered Accessibility Specialist (RAS) and submit 95-percent plans and specifications to the RAS for review to obtain approval through the TDLR ADA compliance review. Upon receipt of comments, Engineer will make appropriate changes in the contract documents to address requested changes.

Deliverables: Two hard copies (plans and specifications) to TDLR for review and response letter to address comments

2.4. City Building Permit Review

Engineer will coordinate with City Building Permit and submit plans for review and approval at the 90% Design Deliverable. Engineer will conduct a pre-application meeting with the city Building Permit to review general scope of work and proposed site plan to facilitate site plan and building review. Engineer will prepare and submit a permit package to City Building Permit. Upon receipt of plan review comments, Engineer will respond in writing and make necessary changes to the contract documents and resubmit a 100- percent set of signed and sealed bid documents.

Deliverables: Two hard copies (plans and specifications) to City Building Permit for review and response letter to address comments

2.5. FAA Coordination

Engineer will develop and submit layout and elevation data for proposed new structures to the FAA to review through its online portal. Engineer will submit permanent obstruction data and temporary construction data such as construction cranes used during construction.

Deliverables: FAA Online Portal Submittal

2.6. Final Bid-Ready Plans, Specifications, and 100% OPCC

The plans and specifications will be finalized based on comments from City and OR. Engineer will seal and sign the completed documents. Engineer will update plans and specifications with any final comments prior to finalizing for construction. Plans and specifications will be provided as one set of documents and not in separate packages.

Deliverables: Electronic PDF of final bid-ready plans and specifications (Issue for Bid set); 100% OPCC

2.7. Bidding Phase Support and Conformed Documents

It is our understanding that the project will be delivered via a Competitive Sealed Proposal (CSP) process. Upon completion of the Contract Documents, Engineer will assist the City in the bidding phase and provide the following services:

- Attend a pre-bid meeting and site walkthrough.
- Respond to questions during bidding, prepare and issue addenda if necessary. It is anticipated that no more than five addenda will be issued.
- Prepare bid tabulation, evaluate bids, and submit a letter of recommendation of award.
- Engineer will update Issue for Bid plans and specifications to incorporate addenda from the bidding phase to prepare conformed documents or Issue for Construction set.

It is assumed the bidding phase will be two months from January 2022 through February 2022.

Deliverables: Addenda as Required to Response to Bidder's Questions;
Bid Tab;
Engineer Letter of Recommendation of Bid Award;
Electronic Conformed Documents including plans and specifications in PDF

2.8. Coordination Meetings with OR and Other Consultants

Miscellaneous coordination meetings with city OR, and other consultants who are currently working on the Elevated Storage Tank project, Weiss Lane/Pecan Street Water Lines project, and Generator project to coordinate design items throughout the project.

It is assumed that no more than six (6) coordination meetings will be held virtually during the design phase. Each meeting will be no more than two (2) hours in length. Other miscellaneous coordination will be handled via email correspondence or as part of progress meetings.

TASK 3.0 – MEMBRANE PRE-SELECTION AND PROCUREMENT

The existing membrane equipment will be replaced as part of the plant expansion. The new membrane equipment will be installed inside the existing basins. Replacement will also be made to the membrane ancillary system. An equipment pre-selection process is proposed for the membrane system during the final design phase.

3.1. Membrane Pre-screening and Selection Workshop

Engineer will conduct a workshop with the City and OR and discuss a pre-screening and selection

process to select a qualified membrane equipment supplier to advance the membrane system design from 60% to completion. This workshop will cover the following:

- A recommended workflow chart to describe the pre-screening and full-scale selection and procurement process;
- Development of pre-screening criteria and a ranking process for using to determine potential prequalified membrane suppliers. This systematic approach will result in screening of membrane system suppliers who can effectively participate in the full-scale plant membrane equipment procurement process;
- Development of a full-scale membrane procurement process, evaluation criteria (cost and non-cost), and a ranking matrix for using in the selection.

Engineer will incorporate comments and feedback from the City/OR in the final evaluation documents.

Deliverables: Membrane Selection Workflow Chart, Pre-screening Criteria and Ranking Matrix for Prequalification, Full-scale Evaluation Criteria and Ranking Matrix, Workshop Agenda and Summary.

3.2. Prepare Pre-Selection Proposal Documents

Engineer will prepare technical specifications and associated drawings and figures necessary for the pre-selection of membrane elements and associated equipment to be provided for the plant expansion. The front-end documents will be provided by the City and modified accordingly by Ardurra. The equipment specifications will be prepared as part of Task 2.0. The proposal documents will include requirements for capital costs, membrane replacement costs, warranty provisions, annual consumption of power and chemicals, and warranty provisions.

Deliverables: Pre-selection Proposal Documents.

3.3. Membrane Pre-Selection Process Assistance

Engineer will attend a pre-proposal meeting, prepare written responses to manufacturer's questions, prepare required addenda, and attend proposal opening.

Deliverables: Pre-proposal meeting agenda, meeting summary and addenda to the documents.

3.4. Membrane System Pre-Selection Evaluation

Engineer will evaluate the received proposals and provide a recommendation of award for the pre-selection equipment. The evaluation may include capital and annual operating costs, present worth costs, and non- economic factors.

Deliverables: Evaluation Spreadsheet Tabulation and Recommendation for Award

TASK 4.0 – POWER SYSTEM STUDIES

Power system studies are necessary to assist in meeting the latest NFPA, NEC, and OSHA requirements for an existing or new electrical distribution system. Power system studies include, but are not limited to, the following components:

- Short Circuit Analysis
- Arc Flash Hazard Analysis and Hazard Mitigation Options

A preliminary power study for purposes of determining the available short circuit duties and potential arc flash hazard will be performed during the final design phase. The final power system study can be provided during the construction phase to include final protective device coordination and arc flash labeling, once the actual equipment manufacturer is selected.

Engineer will perform a short circuit analysis to evaluate the adequacy of the electrical equipment to withstand the electro-magnetic forces of calculated fault current levels until the circuit can be interrupted in a reasonable amount of time.

Engineer will perform an arc flash hazard analysis to evaluate the incident energy at various locations by analyzing the fault current and protective device scheme within the distribution, categorizes these hazards based on the latest NFPA requirements, and facilitates in the production of arc flash hazard warning levels.

Deliverables: Power System Studies Report

TASK 5.0 – TWDB DWSRF/EPA WIFIA FUNDING APPLICATION SUPPORT SERVICES

As requested by the City/OR, Engineer will prepare continued supports to provide documents and deliverables necessary for the completion of the funding applications by the City/OR. It is our understanding that the OR is responsible for preparing, coordinating, and submitting the funding application(s) for this project. It is our understanding that the project will be funded via EPA WIFIA and TWDB DWSRF.

Engineer will attend no more than two (2) virtual meetings with the City/OR if required. Each meeting is anticipated to be one hour in length.

TASK 6.0 – DISINFECTION CT STUDY UPDATE

As part of the plant expansion, the plant disinfection CT study will need to be updated. Engineer will review current CT study and plant monthly operating reports. The CT study will be updated to incorporate proposed expansion improvements. Engineer will submit the updated CT study to TCEQ for review and approval. Engineer will address review comments in the final submittal.

Deliverables: Disinfection CT Study Update

TASK 7.0 – CONSTRUCTION SCHEDULE OPTIMIZATION WORKSHOP

Engineer will conduct a workshop to review project scope, proposed improvements, site plan development, anticipated construction challenges, construction staging and phasing plan etc. Potential bidders will be invited to this meeting. This meeting is anticipated to be two hours in length.

Following this meeting, a one-to-one discussion session will be held with potential bidders to discuss opportunities for construction schedule optimization. Each discussion session will be one hour in length, and it is anticipated no more than five (5) sessions will be held with Engineer, City, and City OR.

Deliverables: Project Overview Workshop Agenda, Handout, and Summary; Schedule Optimization Discussion Summary

TASK 8.0 –MEMBRANE PILOT STUDY

In effort to maintain project construction schedule, a membrane pilot test will be conducted to validate design criteria proposed for the plant expansion and obtain regulatory approval from TCEQ. The pilot test will be conducted on the selected membrane system only, with a high-rate plate settler pretreatment process.

8.1. Pilot Testing Protocol

Engineer will develop a pilot testing plan that will be a comprehensive guide to the activities to be undertaken during the pilot phase investigations. The pilot testing protocols will outline and address the following:

- Objectives and goals.
- State requirements for membrane pilot testing.
- Raw water quality and treatment goals.
- Pilot layout, design criteria, ancillary requirements.
- Schedule.
- Testing procedures and description of operations.
- Testing matrix outlining the conditions, flows, loadings, duration, runs, and other relevant information for each proposed testing series.
- Water quality sampling, testing, and monitoring. It is assumed that the City will pay laboratory testing. Analytical testing can be handled either via their in-house or contract testing laboratory. Engineer will assist to identify certified laboratories.
- Quality Assurance/Quality Control (QA/QC) procedures.
- Roles, responsibilities, and communications.
- Data collection, processing and reporting.

The Pilot testing protocol will be developed following a State guidance for membrane pilot testing. The pilot study protocol will be presented to TCEQ and comments will be incorporated into the Final Protocol prior to implementation.

Engineer will discuss the Pilot Testing Protocol with the selected membrane system supplier. This is to ensure that the supplier understands pilot testing requirements, data monitoring, and reporting, to meet expectation for subsequent pilot study report submittal.

Deliverables: Draft and Final Pilot Study Protocol.

8.2. Pilot Plant Facilities

The pilot plant will consist of a pretreatment pilot skid including rapid mix, three stage flocculation followed by plate settlers, and a membrane module pilot skid from the selected membrane system supplier, to mimic the full-scale treatment process as proposed for the plant expansion.

Pilot Facilities Design Document Development: Engineer will develop design documents of the pilot facilities for inclusion in the membrane procurement package for purposes of bidding. The documents will include:

- One line drawing indicating electrical supply and feed requirements.

- Process flow schematics indicating the arrangement of components, interconnection pipe sizes, valves & fittings, and other information.
- Raw water supply general layout drawings.
- Disposal of treated water, waste backwash water, chemical cleaning waste after neutralization.
- General plan view showing arrangement of equipment and key components.

Engineer will also assist to identify chemical suppliers that would be required for the pilot testing, estimated chemical quantities and obtained chemical safety handling procedures. It is assumed that pilot testing chemicals will be paid by the City.

Pilot Facilities Installation and Start-up Assistance: The selected membrane system supplier is responsible for procuring pilot equipment in accordance with the membrane procurement package. Construction of the pilot facilities, installation of the equipment, and demolition of the pilot facilities, will be handled by the selected membrane system supplier. Shipping and unloading of the pilot equipment shall also be handled by the selected membrane system supplier. Engineer will coordinate delivery schedule with the City.

Engineer will make two (2) site visits (up to 8 hours each) to oversee construction of the pilot facilities and installation of pilot testing equipment. Engineer will perform a final walkthrough to make sure pilot setup/construction and equipment installation are in accordance with the layouts prepared.

Engineer will participate in start-up and confirm that systems are operational. This level of effort assumes two (2) personnel in the field for a total of four site visits (8 hours each) to complete installation oversight, final walkthrough, and start-up of the pilot.

8.3. Pilot Operations

Engineer will provide personnel to maintain routine operation of the pilot, monitor and collect data required from the pilot equipment in accordance with the pilot sampling, monitoring, and analysis plan outlined in the Pilot Testing Protocol. Engineer will collect field water samples (raw, membrane feed, membrane filtrate, waste backwash water, etc.), perform onsite field testing, and coordinate required analyses by certified laboratories. Engineer will be responsible for coordinating with testing laboratory for delivery of sample bottles, chain-of-custody, and sample shipment. Engineer will document daily operation logs, event logs, field grab sample results, field issues and observations etc**.**

Engineer will provide one half-time staff (eight hours per day on Mondays and Wednesdays, and 4 hours per day on Fridays) to maintain operations and collect the data required from the pilot equipment. For Tuesdays, Thursdays and weekends, City staff will support the pilot operations.

- Initial start-up: It is expected that following completion of the pilot equipment set up activities, one week of piloting will be performed to validate operations, establish standard operating procedures (SOPs), and prepare for routine pilot operations.

- Routine Pilot Operations: Pilot operations will be conducted for a period of up to ninety (90) days and will be focused on validating design criteria, operating parameters, and treatment performance. Engineer will be responsible for routine daily operation during pilot testing.

- Regular communications: Throughout the pilot testing, Engineer will conduct weekly calls with the membrane supplier to review pilot operation, performance and any field issues. It is assumed each call will be 30- minutes in length.

8.4. Pilot Study Report

Upon completion of the pilot testing, Engineer will prepare a draft pilot study report to summarize results and findings. The pilot study report will be developed in accordance with TCEQ requirements. The draft report will be submitted to the City/OR for review comments. Upon incorporating review comments, the final report will be submitted to TCEQ for review and approval.

Three (3) pilot testing review meetings will be held over the course of the pilot study to present interim results and findings to the city/OR. The review meetings will be held at the end of each pilot testing stage, and it is anticipated that each meeting will be two hours in length.

Deliverables: Draft and Final Pilot Study Report; Pilot Testing Review Meeting Agenda and Summary**.**

TASK 9.0 – ADDITIONAL SERVICE TASKS

These items are not part of the basic engineering services and will be added to the scope of services upon written authorization from the City. The services provided under this task will be used at the City's discretion on an as-needed basis.

9.1. Geotechnical Engineering Supports during Design Phase (on an as-needed cost basis)

If required, Engineer will obtain as-needed assistance from geotechnical subconsultant to coordinate issues related to the WTP expansion design. This task will be performed on a time and material basis and will only be performed upon written authorization from the city.

9.2. Subsurface Utilities Engineering (SUE) (on an as-needed cost basis)

If required, Engineer will conduct a subsurface utilities investigation in the improvements/expansion areas in order to identify utilities conflicts for design of new structures. This task will be performed on a time and material basis and will only be performed upon written authorization from the city. The allowance is based on no more than 10 potholes.

10.0 – OTHER SERVICE TASKS, CLARIFICATIONS AND EXCLUSIONS

Other service tasks will be negotiated with the City as needed, including additional studies and investigation as required to support recommended solution and/or as required to address system which may become affected as a result of the proposed work but not originally envisioned or as added by the City. These other services may include the following and will be authorized by the City in writing for an additional fee as agreed upon by the City and the Engineer:

1. Any additional meetings, outside of those listed herein
2. Treatability studies
3. Pilot study analytical laboratory testing

4. Pilot plant construction and pilot equipment
5. Pilot testing chemicals
6. Hydraulic transient analysis
7. Any off-site survey work outside the plant fence line
8. Any additional geotechnical borings and laboratory testing
9. Phase 1 and Phase 2 environmental site assessment (ESA)
10. USACE Permitting
11. Archeological investigation Services
12. Computational fluid dynamics (CFD) modeling
13. Plant security system design
14. Construction management and inspection by Others
15. Material testing by Others
16. Plant SCADA system programming and application engineering services (anticipated for the construction phase)
17. Texas Department of Insurance design review as city is located outside of tier 1 counties
18. Physical laboratory scale modeling
19. Drawings will be developed in 2D version of AutoCAD
20. Site landscaping
21. Development of value engineering design options and associated cost savings
22. Membrane system redesign as required to accommodate the selected manufacturer after the membrane equipment selection
23. Hard copies of conformed plans and specifications

TABLE A-1
City of Pflugerville WTP Expansion Anticipated Deliverables

Task No.	Project Task	Deliverable(s)	
1	Project Management and Quality Assurance	1	Project Status Reports and Schedule Update
		2	Progress Meeting Agenda and Minutes
		3	Decision Log Update
		4	60% Review Comments Response Logs
		5	90% Review Comments Response Logs
2	Final Design and Bidding Phase	6	Electronic PDF of 60% plans and specifications; 60% opinion of probable construction cost (OPCC)
		7	Electronic PDF of 90% plans and specifications; 90% opinion of probable construction cost (OPCC)
		8	Two hard copies (plans and specifications) to TCEQ for review and response letter to address comments
		9	Two hard copies (plans and specifications) to TDLR for review and response letter to address comments
		10	Two hard copies (plans and specifications) to City Building Permit for review and response letter to address comments
		11	FAA Online Portal Submittal
		12	Electronic PDF of final bid-ready plans and specifications (Issue for Bid set); 100% OPCC
		13	Addenda as Required to Response to Bidder's Questions; Bid Tab; Engineer Letter of Recommendation of Bid Award; Conformed Documents including one electronic PDF of plans and specifications
3	Membrane Pre-Selection and Procurement	14	Membrane Selection Workflow Chart, Pre-screening Criteria and Ranking Matrix for Prequalification, Full-scale Evaluation Criteria and Ranking Matrix, Workshop Agenda and Summary
		15	Pre-selection Proposal Documents
		16	Pre-proposal meeting agenda, meeting summary and addenda to the documents
		17	Evaluation Spreadsheet Tabulation and Recommendation for Award
4	Power System Studies	18	Power System Studies Report

Task No.	Project Task	Deliverable(s)	
5	TWDB DWSRF/EPA WIFIA Funding Application Support Services	19	None
6	Disinfection CT Study Update	20	Disinfection CT Study Update
7	Construction Schedule Optimization Workshop	21	Project Overview Workshop Agenda, Handout, and Summary; Schedule Optimization Discussion Summary
8	Membrane Pilot Study	22	Draft and Final Pilot Study Protocol
		23	Draft and Final Pilot Study Report; Pilot Testing Review Meeting Agenda and Summary
9	Additional Service Tasks	24	None

TABLE A-2
City of Pflugerville WTP Expansion
Anticipated Meetings/Workshops

Task No.	Project Task	Meetings/Workshops	
1	Project Management and Quality Assurance	1	Kick-off and Five (5) Progress Meetings with City/OR
		2	Three (3) City Review Meetings at 60%
		3	Three (3) City Review Meetings at 90%
2	Final Design and Bidding Phase	4	CSP Criteria Development Workshop
		5	Two TCEQ Coordination Meetings
		6	City Building Permit Review Pre-application meeting
		7	Pre-Bid Meeting
		8	Six (6) Coordination Meetings with OR and Other Consultants
3	Membrane Pre-Selection and Procurement	9	Membrane Pre-screening and Selection workshop
		10	Pre-proposal meeting
4	Power System Studies	11	None
5	TWDB DWSRF/EPA WIFIA Funding Application Support Services	12	None
6	Disinfection CT Study Update	13	None
7	Construction Schedule Optimization Workshops	14	One workshop followed by five (5) discussion sessions with potential bidders
8	Membrane Pilot Study	15	Three (3) Membrane pilot testing review meetings
9	Additional Service Tasks	16	None

TABLE A-3
City of Pflugerville WTP Expansion
Anticipated Meetings/Workshops Schedule and Potential Topics

Task No.	Meetings/Workshops	Anticipated Date	Potential Topics
1.2	Kick-off Meeting	July 2021	Project Scope, Schedule, Budget; Additional documents as needed for final design; Project Communication Protocol, Site Visit Coordination, Project Document Control
1.2	Monthly Progress Meeting #1	August 2021	Design progress update
3.1	Membrane Pre-screening and Selection Workshop	August 2021	Selection workflow process; prescreening criteria, full-scale selection criteria and ranking matrix
7.0	Construction Schedule Optimization Workshop	September 2021	Opportunities for schedule optimization
1.2	Monthly Progress Meeting #2	October 2021	Design progress update
3.1	Membrane Pre-proposal meeting	October 2021	Review project scope, schedule and critical components with potential membrane bidders
2.1	CSP Criteria Development Workshop	October 2021	CSP process and selection criteria
1.5	60% Review Meetings (3 in total)	November 2021	Review 60% deliverable, OPCC, and Comments
1.2	Monthly Progress Meeting #3	December 2021	Design progress update
2.4	City Building Permit Review Pre-application meeting	December 2021	Review proposed improvements and site plan for WTP Expansion
1.5	90% Review Meetings (3 in total)	January 2022	Review 90% deliverable, OPCC, and Comments
1.2	Monthly Progress Meeting #4	February 2022	Design progress update
8.3	Membrane Pilot Progress Meeting #1	February 2022,	Pilot testing progress update at the end of stage 1
1.2	Monthly Progress Meeting #5	March 2022	Design progress update
8.3	Membrane Pilot Progress Meeting #2	March 2022	Pilot testing progress update at the end of stage 2
2.7	Pre-Bid Meeting	April 2022	Review project scope, schedule and critical components with potential bidders

Task No.	Meetings/Workshops	Anticipated Date	Potential Topics
8.3	Membrane Pilot Progress Meeting #3	April 2022	Pilot testing progress update at the end of stage 3
2.3	Two Coordination Meetings with TCEQ	TBD	Regulatory design coordination
2.8	Six (6) Coordination Meetings with Other Consultants	TBD	Design coordination with ongoing CIP project consultants

Note: Assume NTP is received in mid-July of 2021.

TABLE A-4
Summary of Services and Fees

TASK NO.	TASK DESCRIPTION	AMOUNT
1.0	Project Management and Quality Assurance (LS)	$544,519.00
2.0	Final Design and Bidding Phase (LS)	$4,081,193.00
3.0	Membrane Pre-Selection and Procurement (LS)	$111,986.00
4.0	Power System Studies (LS)	$27,888.00
5.0	TWDB DWSRF/EPA WIFIA Funding Application Support Services (LS)	$36,860.00
6.0	Disinfection CT Study Update (LS)	$30,560.00
7.0	Construction Schedule Optimization Workshops (LS)	$25,800.00
8.0	Membrane Pilot Study (LS)	$212,502.00
9.0	Additional Service Tasks (on an as-needed basis)	$46,250.00
	Project Expenses including reproduction, deliveries, travel lodging, meal, mileage expenses, misc. pilot test supplies, and any other direct costs as authorized by the City (Reimbursable Not to Exceed)	$85,971.00
TOTAL		**$5,203,529.00**

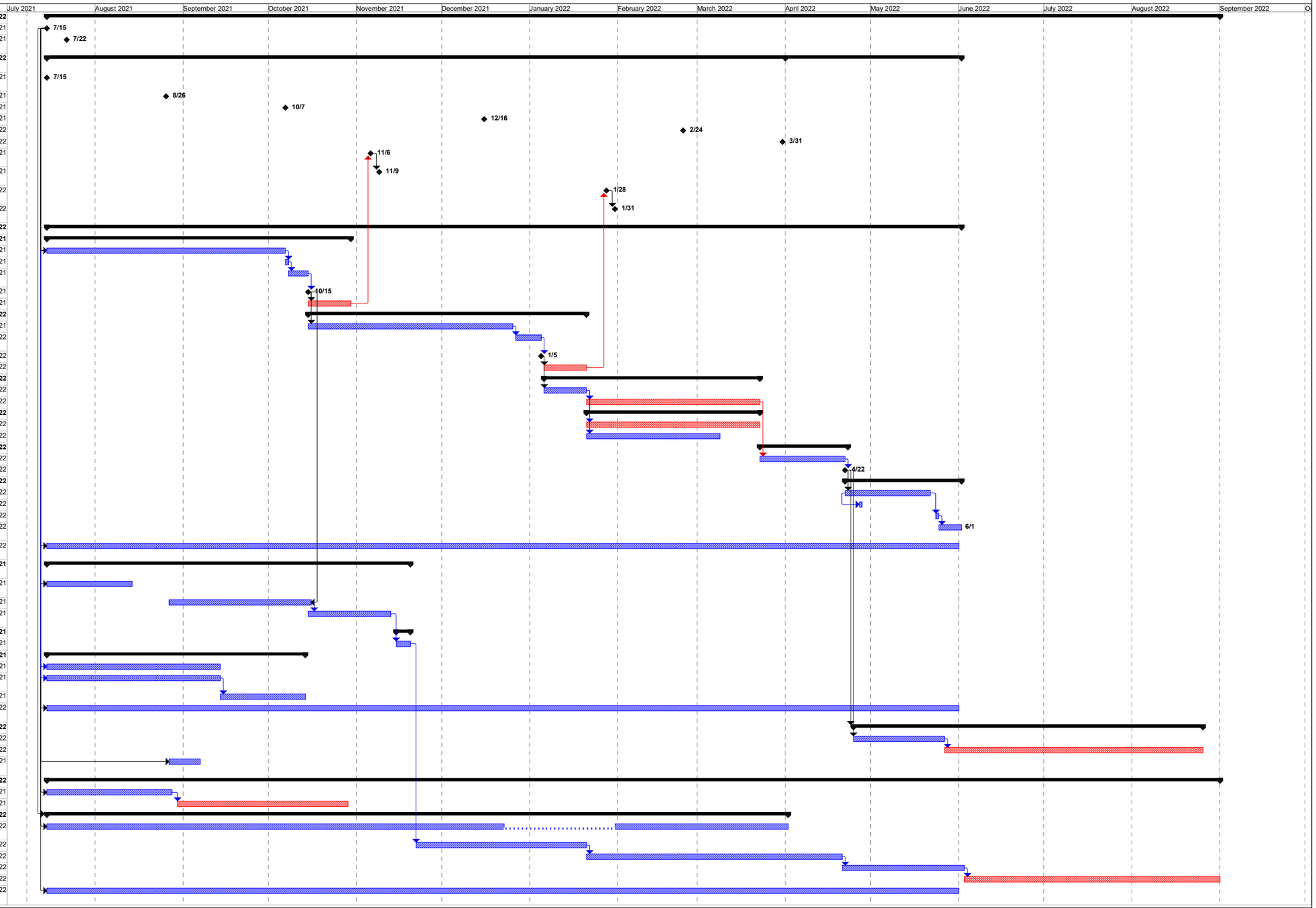
LS – Lump Sum
HNE – Hourly Not to Exceed

TABLE A-5
HOURLY LABOR RATES

LABOR CATEGORY	Hourly Rate
Project Principal/Sr. Project Manager	$275
Sr. Tech Specialist (QA/QC)	$275
Senior Project Engineer(Process Mech)	$225
Project Engineer (Process Mech)	$165
EIT	$128
Senior Project Manager (Structural/Architectural)	$240
Project Engineer (Structural/Architectural)	$205
Senior Environmental Scientist	$215
Environmental Scientist	$125
Cost Estimator	$145
CAD Designer	$150
CAD Technician	$100
Word Processor	$120
Contract Admin	$90

CITY OF PFLUGERVILLE
WATER TREATMENT PLANT EXPANSION
FINAL DESIGN AND BIDDING PHASE

ID	Task Name	Duration	Start	Finish
1	**Final Design and Bid Phase**	**413 days**	**Thu 7/15/21**	**Wed 8/31/22**
2	Notice to Proceed	1 day	Thu 7/15/21	Thu 7/15/21
3	Kick-Off Meeting with Ardurra and City (To be confirmed)	1 day	Thu 7/22/21	Thu 7/22/21
4	**Task 1.0 Project Management and Quality Assurance**	**322 days**	**Thu 7/15/21**	**Wed 6/1/22**
5	Kick-Off Meeting with Ardurra and City (To be confirmed)	0 days	Thu 7/15/21	Thu 7/15/21
6	Progress Meeting No. 1 (To be confirmed)	8 days	Thu 8/26/21	Thu 9/2/21
7	Progress Meeting No. 2 (To be confirmed)	1 day	Thu 10/7/21	Thu 10/7/21
8	Progress Meeting No. 3 (To be confirmed)	1 day	Thu 12/16/21	Thu 12/16/21
9	Progress Meeting No. 4 (To be confirmed)	1 day	Thu 2/24/22	Thu 2/24/22
10	Progress Meeting No. 5 (To be confirmed)	1 day	Thu 3/31/22	Thu 3/31/22
11	60% City Review Meeting - Process Mech (to be confirmed)	1 day	Sat 11/6/21	Sat 11/6/21
12	60% City Review Meeting - EIC, Arch/Structural/HPF (to be confirmed)	1 day	Tue 11/9/21	Tue 11/9/21
13	90% City Review Meeting - Process Mech (to be confirmed)	1 day	Fri 1/28/22	Fri 1/28/22
14	90% City Review Meeting - EIC, Arch/Structural/HPF (to be confirmed)	1 day	Mon 1/31/22	Mon 1/31/22
15	**Task 2.0 Final Design and Bidding Phase**	**322 days**	**Thu 7/15/21**	**Wed 6/1/22**
16	**2.1 60% Plans, Specs and OPCC**	**107 days**	**Thu 7/15/21**	**Fri 10/29/21**
17	Develop 60% Design	84 days	Thu 7/15/21	Wed 10/6/21
18	CSP Criteria Development Workshop	1 day	Thu 10/7/21	Thu 10/7/21
19	Internal Review and QA/QC & Comments incorporation	7 days	Fri 10/8/21	Thu 10/14/21
20	Submit 60% Design	1 day	Fri 10/15/21	Fri 10/15/21
21	City/OR Review	15 days	Fri 10/15/21	Fri 10/29/21
22	**2.2 90% Plans, Specs and OPCC**	**98 days**	**Fri 10/15/21**	**Thu 1/20/22**
23	Develop 90% Design	72 days	Fri 10/15/21	Sat 12/25/21
24	Internal Review and QA/QC & Comments incorporation	9 days	Mon 12/27/21	Tue 1/4/22
25	Submit 90% Design	1 day	Wed 1/5/22	Wed 1/5/22
26	City/OR Review	15 days	Thu 1/6/22	Thu 1/20/22
27	**2.3 TCEQ and TDLR Review Set**	**76 days**	**Thu 1/6/22**	**Tue 3/22/22**
28	Develop TCEQ Plan Review Set	15 days	Thu 1/6/22	Thu 1/20/22
29	TCEQ Plan Review	61 days	Fri 1/21/22	Tue 3/22/22
30	**2.4 City Building Permit Review**	**61 days**	**Fri 1/21/22**	**Tue 3/22/22**
31	Building Permit Review	61 days	Fri 1/21/22	Tue 3/22/22
32	**2.5 FAA Submittal**	47 days	Fri 1/21/22	Tue 3/8/22
33	**2.6 Bid-Ready Plans, Specs and OPCC**	**31 days**	**Wed 3/23/22**	**Fri 4/22/22**
34	Develop 100% Design	30 days	Wed 3/23/22	Thu 4/21/22
35	Final Bid-ready Set	1 day	Fri 4/22/22	Fri 4/22/22
36	**2.7 Bidding Phase**	**41 days**	**Fri 4/22/22**	**Wed 6/1/22**
37	City Advertisement	30 days	Fri 4/22/22	Sat 5/21/22
38	Pre-bid Meeting & Site Walkthrough	1 day	Wed 4/27/22	Wed 4/27/22
39	Bid Open	1 day	Tue 5/24/22	Tue 5/24/22
40	Bids Evaluation and Recommendation of Award	8 days	Wed 5/25/22	Wed 6/1/22
41	2.8 Coordination Meetings with OR/Other Consultants	321 days	Thu 7/15/21	Tue 5/31/22
42	**Task 3.0 Membrane Pre-Selection and Procurement**	**128 days**	**Thu 7/15/21**	**Fri 11/19/21**
43	3.1 Membrane Prescreening and Selection Workshop	30 days	Thu 7/15/21	Fri 8/13/21
44	3.2 Prepare Pre-selection Proposal Documents	50 days	Fri 8/27/21	Fri 10/15/21
45	3.3 Proposal Solicitation and Pre-Proposal Meeting	29 days	Fri 10/15/21	Fri 11/12/21
46	**3.4 Membrane System Pre-Selection Evaluati**	**5 days**	**Mon 11/15/21**	**Fri 11/19/21**
47	Proposal Evaluation & Selection	5 days	Mon 11/15/21	Fri 11/19/21
48	**Task 4.0 Power System Studies**	**91 days**	**Thu 7/15/21**	**Wed 10/13/21**
49	Short Circuit Analysis	61 days	Thu 7/15/21	Mon 9/13/21
50	Arc Flash Hazard Analysis and Mitigation Options	61 days	Thu 7/15/21	Mon 9/13/21
51	Power System Studies Report	30 days	Tue 9/14/21	Wed 10/13/21
52	**Task 5.0 TWDB DWSRF Funding Application Support Services**	321 days	Thu 7/15/21	Tue 5/31/22
53	**Task 6.0 Disinfection CT Study Update**	**123 days**	**Mon 4/25/22**	**Thu 8/25/22**
54	CT Study Update	32 days	Mon 4/25/22	Thu 5/26/22
55	TCEQ Review	91 days	Fri 5/27/22	Thu 8/25/22
56	**Task 7.0 Construction Schedule Optimization Workshops**	11 days	Fri 8/27/21	Mon 9/6/21
57	**Task 8.0 Membrane Pilot Study**	**413 days**	**Thu 7/15/21**	**Wed 8/31/22**
58	8.1 Pilot Testing Protocol	44 days	Thu 7/15/21	Fri 8/27/21
59	TCEQ Pilot Testing Protocol Review	60 days	Mon 8/30/21	Thu 10/28/21
60	**8.2 Pilot Plant Facilities**	**261 days**	**Thu 7/15/21**	**Fri 4/1/22**
61	Pilot Facilities Design Document Development	222 days	Thu 7/15/21	Fri 4/1/22
62	Pilot Facilities Installation and Start-up	60 days	Mon 11/22/21	Thu 1/20/22
63	8.3 Pilot Operations	90 days	Fri 1/21/22	Wed 4/20/22
64	8.4 Pilot Study Report	43 days	Thu 4/21/22	Thu 6/2/22
65	TCEQ Pilot Report Review	90 days	Fri 6/3/22	Wed 8/31/22
66	**Task 9.0 Additional Service Tasks Allowance (as needed)**	321 days	Thu 7/15/21	Tue 5/31/22



Date: Thu 7/8/21

Task | Split | Milestone | Summary | Project Summary | External Tasks | External Milestone | Inactive Task | Inactive Milestone | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Progress | Deadline

APPENDIX B

City of Pflugerville WTP Expansion
Preliminary Engineering Design Phase
Fee Summary

				Subconsultants				
Task		Total Fee	Ardurra	KFriese (Site Civil, Process Mechanical Support)	Mbroh (I&C, SCADA)	Gupta (Electrical)	AACE (MEP/HPF)	HVJ (Geotech)
		($)	($)		($)	($)	($)	($)
1.0	**General Project Management and Quality Control (LS)**	$ 544,519.00	$ 386,829.00	$ 29,040.00	$ 79,700.00	$ 31,950.00	$ 17,000.00	$ -
2.0	**Final Design and Bidding Phase (LS)**	$ 4,081,193.00	$ 2,706,550.00	$ 327,840.00	$ 211,520.00	$ 743,230.00	$ 92,053.00	$ -
3.0	**Membrane Pre-Selection and Procurement (LS)**	$ 111,986.00	$ 100,946.00	$ -	$ 4,500.00	$ 6,540.00	$ -	$ -
4.0	**Power System Studies (LS)**	$ 27,888.00	$ 1,328.00	$ -	$ -	$ 26,560.00	$ -	$ -
5.0	**TWDB DWSRF/EPA WIFIA Funding Application Support Services (LS)**	$ 36,860.00	$ 36,860.00	$ -	$ -	$ -	$ -	$ -
6.0	**Disinfection CT Study Update (LS)**	$ 30,560.00	$ 30,560.00	$ -	$ -	$ -	$ -	$ -
7.0	**Construction Schedule Optimization Workshops (LS)**	$ 25,800.00	$ 25,800.00	$ -	$ -	$ -	$ -	
8.0	**Membrane Pilot Study (LS)**	$ 212,502.00	$ 212,502.00					
9.0	**Additional Service Tasks (as needed)**	$ 46,250.00	$ 21,250.00	$ -	$ -	$ -	$ -	$ 25,000.00
	9.1 Geotechnical Engineering Supports during Design Phase (as needed)	$ 26,250.00	$ 1,250.00					$ 25,000.00
	9.2 Subsurface Utilities Engineering (SUE) (as needed)	$ 20,000.00	$ 20,000.00	$ -	$ -	$ -	$ -	$ -
	Project Expenses including reproduction, deliveries, travel lodging, meal, mileage expenses, misc. pilot test supplies, and any other direct costs as authorized by the City (Reimbursable Not to Exceed)	$ 85,971.00	$ 55,910.00	$ 7,880.00	$ 1,600.00	$ 19,581.00	$ 1,000.00	$ -
	TOTAL	**$5,203,529.00**	**$3,578,535.00**	**$364,760.00**	**$297,320.00**	**$827,861.00**	**$110,053.00**	**$25,000.00**
			68.77%	**7.01%**	**5.71%**	**15.91%**	**2.11%**	**0.48%**
			Non HUB	**HUB**	**HUB**	**HUB**	**HUB**	**HUB**
	Non HUB Subtotal	**68.77%**						
	HUB Subtotal	**31.23%**						

APPENDIX B

City of Pflugerville WTP Expansion
Preliminary Engineering Design Phase
Level of Efforts Fee Estimate

			Ardurra Estimated Man-hours																			Subconsultants								
		Position	Project Principal	QA/QC /Technical Specialist	Sr. PM	Sr. Proj. Eng. (Process Mech)	Proj Eng. (Process Mech)	EIT (Process Mech)	Sr. Proj. Mgr (Structural /Arch)	Proj Eng. (Structural /Arch)	EIT (Structural/Arch)	Sr. Env Scientist	Cost Estimator	CAD Designer	CAD Technician	Word Processor/Project Admin	Contract Admin	**Ardurra - Total Hours**	**Ardurra Subtotal Labor Cost**	**ODCs**	**Ardurra Subtotal**	K Friese (Site Civil, Process Mechanical Support)	Mbroh (I&C, SCADA)	Gupta (Electrical)	AACE (MEP/HPF)	HVJ (Geotech)	**Subconsultant Total**	Ardurra Sub Mark up (5%)	**Total Cost (Ardurra + Subs)**
		Rate	$ 275.00	$ 275.00	$ 275.00	$ 225.00	$ 165.00	$ 128.00	$ 240.00	$ 205.00	$ 128.00	$ 215.00	$ 145.00	$ 150.00	$ 100.00	$ 120.00	$ 90.00	(Hrs)	($)	($)	($)		($)	($)	($)	($)		($)	($)
Task	**Subtask**	**Task Description**																												
Task 1.0		**GENERAL PROJECT MANAGEMENT AND QUALITY CONTROL**																												
	1.1	Project Management	48		96	24	48									24	24	264	$ 57,960.00		$ 57,960.00			$2,410.00			$2,410.00	$ 120.50	$ 60,490.50
	1.2	Project Meetings and Calls	24	48	96	48	144									24		384	$ 83,640.00		$ 83,640.00			$14,400.00			$14,400.00	$ 720.00	$ 98,760.00
	1.3	Project Team Coordination	24		96	48	144	96		24				24		24		480	$ 91,248.00		$ 91,248.00	$7,020.00	$56,060.00	$6,440.00	$8,500.00		$78,020.00	$ 3,901.00	$ 173,169.00
	1.4	Quality Assurance/Quality Control and Internal Technical Review	40	240	24				40	40						48		432	$ 107,160.00		$ 107,160.00	$15,840.00	$13,200.00	$4,860.00	$5,000.00		$38,900.00	$ 1,945.00	$ 148,005.00
	1.5	City/OR Review Meetings			64		64	32		8						24	24	216	$ 38,936.00		$ 38,936.00	$6,180.00	$10,440.00	$3,840.00	$3,500.00		$23,960.00	$ 1,198.00	$ 64,094.00
Task 1.0		**GENERAL PROJECT MANAGEMENT AND QUALITY CONTROL**	**136**	**288**	**376**	**120**	**400**	**128**	**40**	**72**	**0**	**0**		**24**	**0**	**144**	**48**	**1776**	**$ 378,944.00**		**$ 378,944.00**	**$29,040.00**	**$79,700.00**	**$31,950.00**	**$17,000.00**	**$0.00**	**$157,690.00**	**$ 7,884.50**	**$ 544,519.00**
Task 2.0		**FINAL DESIGN AND BIDDING PHASE**																												
	2.1	**60-Percent Plans, Specifications, and OPCC**																												
		Civil, and Site Work, SWPPP			24	40												64	$ 15,600.00		$ 15,600.00	$93,560.98					$93,560.98	$ 4,678.05	$ 113,839.03
		Yard Piping & Site Plan			40	64	240	120						160	160	4		788	$ 120,840.00		$ 120,840.00						$0.00	$ -	$ 120,840.00
		Process Mechanical Design		64	108	180	500	780						640	640	24		2936	$ 433,020.00		$ 433,020.00	$79,498.55					$79,498.55	$ 3,974.93	$ 516,493.48
		Architectural Design			24	40			24	80	32			120	80			400	$ 67,856.00		$ 67,856.00						$0.00	$ -	$ 67,856.00
		Structural Design			24	40			62	185	477			386	734			1908	$ 260,761.00		$ 260,761.00						$0.00	$ -	$ 260,761.00
		HVAC, Plumbing, and Fire Protection Design			24	40												64	$ 15,600.00		$ 15,600.00				$46,006.00		$46,006.00	$ 2,300.30	$ 63,906.30
		Electrical Design			24	40												64	$ 15,600.00		$ 15,600.00			$418,386.00			$418,386.00	$ 20,919.30	$ 454,905.30
		Instrumentation, Control, and SCADA Design			24	40												64	$ 15,600.00		$ 15,600.00		$47,400.00				$47,400.00	$ 2,370.00	$ 65,370.00
		CSP Selection Criteria Development and Review Workshop	20		40		40	40								8		148	$ 29,180.00		$ 29,180.00						$0.00	$ -	$ 29,180.00
		Specifications	24	64	40	64	24	120	8	42	36					80		502	$ 93,658.00		$ 93,658.00	$9,048.00	$38,000.00	$7,320.00	$4,000.00		$58,368.00	$ 2,918.40	$ 154,944.40
		OPCC	16		16		60	60	10	34	24		120			12		352	$ 57,662.00		$ 57,662.00	$7,397.00	$3,000.00	$3,720.00	$1,000.00		$15,117.00	$ 755.85	$ 73,534.85
	2.2	**90-Percent Plans, Specifications, and OPCC**																												
		Civil, and Site Work, SWPPP			16	24												40	$ 9,800.00		$ 9,800.00	$36,578.38					$36,578.38	$ 1,828.92	$ 48,207.30
		Yard Piping & Site Plan			40	64	160	80						100	100	4		548	$ 87,520.00		$ 87,520.00						$0.00	$ -	$ 87,520.00
		Process Mechanical Design		48	72	160	400	600						320	320	24		1944	$ 294,680.00		$ 294,680.00	$31,079.24					$31,079.24	$ 1,553.96	$ 327,313.20
		Architectural Design			16	24			16	60	32			120	80			348	$ 56,036.00		$ 56,036.00						$0.00	$ -	$ 56,036.00
		Structural Design			16	24			46	152	310			278	570			1396	$ 190,380.00		$ 190,380.00						$0.00	$ -	$ 190,380.00
		HVAC, Plumbing, and Fire Protection Design			16	24												40	$ 9,800.00		$ 9,800.00				$22,488.00		$22,488.00	$ 1,124.40	$ 33,412.40
		Electrical Design			16	24												40	$ 9,800.00		$ 9,800.00			$209,193.00			$209,193.00	$ 10,459.65	$ 229,452.65
		Instrumentation, Control, and SCADA Design			16	24												40	$ 9,800.00		$ 9,800.00		$48,400.00				$48,400.00	$ 2,420.00	$ 60,620.00
		Specifications	20	48	40	48	24	100	6	24	32					80		422	$ 77,316.00		$ 77,316.00	$3,480.00	$38,000.00	$3,660.00	$2,000.00		$47,140.00	$ 2,357.00	$ 126,813.00
		OPCC	12		16		48	48	8	24	24		80			4		264	$ 43,756.00		$ 43,756.00	$2,845.00	$2,000.00	$1,860.00	$1,000.00		$7,705.00	$ 385.25	$ 51,846.25
	2.3	**Coordination with TCEQ and Texas Department of Licensing and Regulation (TDLR)**																												
		Coordination with TCEQ			8		24	24								6		62	$ 9,952.00		$ 9,952.00						$0.00	$ -	$ 9,952.00
		Coordination with TDLR			8		16	16	6	32	4					6		88	$ 16,120.00		$ 16,120.00						$0.00	$ -	$ 16,120.00
	2.4	**City Building Permit Review**			16	32	32	64	2	4	4					24		178	$ 29,764.00		$ 29,764.00	$6,020.00	$2,820.00		$2,000.00		$10,640.00	$ 532.00	$ 40,936.00
	2.5	**FAA Coordination**		8	24		24	40						16	24	8		144	$ 23,640.00		$ 23,640.00						$0.00	$ -	$ 23,640.00
	2.6	**Final Bid-Ready Plans, Specifications, and OPCC**																0	$ -		$ -						$0.00	$ -	$ -
		Civil, and Site Work, SWPPP			8	12												20	$ 4,900.00		$ 4,900.00	$14,268.15					$14,268.15	$ 713.41	$ 19,881.56
		Yard Piping & Site Plan			32	40	80	40						80	80			352	$ 56,120.00		$ 56,120.00						$0.00	$ -	$ 56,120.00
		Process Mechanical Design		30	64	120	200	300						140	140	16		1010	$ 161,170.00		$ 161,170.00	$12,104.70					$12,104.70	$ 605.24	$ 173,879.94
		Architectural Design			8	12			8	40	12			80	40			200	$ 32,556.00		$ 32,556.00						$0.00	$ -	$ 32,556.00
		Structural Design			8	12			35	82	158			174	320			789	$ 108,434.00		$ 108,434.00						$0.00	$ -	$ 108,434.00
		HVAC, Plumbing, and Fire Protection Design			8	12												20	$ 4,900.00		$ 4,900.00				$7,800.00		$7,800.00	$ 390.00	$ 13,090.00
		Electrical Design			8	12												20	$ 4,900.00		$ 4,900.00			$69,731.00			$69,731.00	$ 3,486.55	$ 78,117.55
		Instrumentation, Control, and SCADA Design			8	12												20	$ 4,900.00		$ 4,900.00		$11,000.00				$11,000.00	$ 550.00	$ 16,450.00
		Specifications	12	30	40	48	24	60	4	20	12					80		330	$ 61,186.00		$ 61,186.00	$1,392.00	$8,500.00	$1,220.00	$1,000.00		$12,112.00	$ 605.60	$ 73,903.60
		OPCC	8		8		24	24	3	14	14		40			4		139	$ 23,094.00		$ 23,094.00	$1,138.00	$1,000.00	$620.00	$1,000.00		$3,758.00	$ 187.90	$ 27,039.90
	2.7	**Bidding Phase Support and Conformed Documents**																0	$ -		$ -						$0.00	$ -	$ -
		Pre-bid Meeting/Site Walkthrough	8		8		16	16	8	8	8							72	$ 13,672.00		$ 13,672.00	$1,590.00	$1,600.00	$3,680.00			$6,870.00	$ 343.50	$ 20,885.50
		Bidding RFI and Addenda			24	40	80	80	3	12	14			111	94	40		498	$ 74,862.00		$ 74,862.00	$17,535.00	$3,800.00	$9,760.00			$31,095.00	$ 1,554.75	$ 107,511.75
		Bid Tabulation, Evaluation, and Letter of Recommendation			8		12	24										44	$ 7,252.00		$ 7,252.00						$0.00	$ -	$ 7,252.00
		Conformed Set				8	16	24	3	10	8			80	112			261	$ 34,506.00		$ 34,506.00	$9,245.00	$6,200.00	$14,080.00	$3,759.00		$33,284.00	$ 1,664.20	$ 69,454.20
	2.8	**Coordination Meetings with OR and Other Consultants**	12	12	72	24	48	48								48		264	$ 51,624.00		$ 51,624.00	$1,060.00					$1,060.00	$ 53.00	$ 52,737.00
Task 2.0		**FINAL DESIGN AND BIDDING PHASE**	**132**	**304**	**1012**	**1348**	**2092**	**2708**	**252**	**823**	**1201**	**0**	**240**	**2805**	**3494**	**472**	**0**	**16883**	**$ 2,637,817.00**	**$ -**	**$ 2,637,817.00**	**$327,840.00**	**$211,520.00**	**$743,230.00**	**$92,053.00**	**$0.00**	**$1,374,643.00**	**$ 68,732.15**	**$ 4,081,193.00**

APPENDIX B

City of Pflugerville WTP Expansion
Preliminary Engineering Design Phase
Level of Efforts Fee Estimate

			Ardurra Estimated Man-hours																			Subconsultants								
		Position	Project Principal	QA/QC /Technical Specialist	Sr. PM	Sr. Proj. Eng. (Process Mech)	Proj Eng. (Process Mech)	EIT (Process Mech)	Sr. Proj. Mgr (Structural /Arch)	Proj Eng. (Structural /Arch)	EIT (Structural/Arch)	Sr. Env Scientist	Cost Estimator	CAD Designer	CAD Technician	Word Processor/Project Admin	Contract Admin	**Ardurra - Total Hours**	**Ardurra Subtotal Labor Cost**	**ODCs**	**Ardurra Subtotal**	K Friese (Site Civil, Process Mechanical Support)	Mbroh (I&C, SCADA)	Gupta (Electrical)	AACE (MEP/HPF)	HVJ (Geotech)	**Subconsultant Total**	Ardurra Sub Markup (5%)	**Total Cost (Ardurra + Subs)**
		Rate	$ 275.00	$ 275.00	$ 275.00	$ 225.00	$ 165.00	$ 128.00	$ 240.00	$ 205.00	$ 128.00	$ 215.00	$ 145.00	$ 150.00	$ 100.00	$ 120.00	$ 90.00	(Hrs)	($)	($)	($)		($)	($)	($)	($)		($)	($)
Task	**Subtask**	**Task Description**																												
Task 3.0 - MEMBRANE PRE-SELECTION AND PROCUREMENT																														
	3.1	Membrane Selection workflow, Pre-Screening criteria, full-scale selection criteria development and Review Workshop	16	16	40		60	24								8		164	$ 33,732.00		$ 33,732.00						$0.00	$ -	$ 33,732.00
	3.2	Prepare Pre-Selection Proposal Documents		32	24		60	48								20		184	$ 33,844.00		$ 33,844.00						$0.00	$ -	$ 33,844.00
	3.3	Membrane Pre-Selection Process Assistance		8	16		24	8	6	10	12					4		88	$ 17,090.00		$ 17,090.00		$4,500.00	$6,540.00			$11,040.00	$ 552.00	$ 28,682.00
	3.4	Membrane System Pre-Selection Evaluation		12	12		40	16								4		84	$ 15,728.00		$ 15,728.00						$0.00	$ -	$ 15,728.00
Task 3.0 - MEMBRANE PRE-SELECTION AND PROCUREMENT			**16**	**68**	**92**	**0**	**184**	**96**	**6**	**10**	**12**	**0**	**0**	**0**	**0**	**36**	**0**	**520**	**$ 100,394.00**	**$ -**	**$ 100,394.00**	**$0.00**	**$4,500.00**	**$6,540.00**	**$0.00**	**$0.00**	**$11,040.00**	**$ 552.00**	**$ 111,986.00**
Task 4.0 - POWER SYSTEM STUDIES																														
		Short circuit analysis																0	$ -		$ -			$13,280.00			$13,280.00	$ 664.00	$ 13,944.00
		Arc Flash Hazard Study																0	$ -		$ -			$13,280.00			$13,280.00	$ 664.00	$ 13,944.00
Task 4.0 - POWER SYSTEM STUDIES			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**$ -**	**$ -**	**$ -**	**$0.00**	**$0.00**	**$26,560.00**	**$0.00**	**$0.00**	**$26,560.00**	**$ 1,328.00**	**$ 27,888.00**
Task 5.0 - TWDB DWSRF/EPA WIFIA FUNDING APPLICATION SUPPORT SERVICES																														
		Funding Application Supports			16		40	40				60			40	32		228	$ 36,860.00		$ 36,860.00						$0.00	$ -	$ 36,860.00
Task 5.0 - TWDB DWSRF/EPA WIFIA FUNDING APPLICATION SUPPORT SERVICES			**0**	**0**	**16**	**0**	**40**	**40**	**0**	**0**	**0**	**60**	**0**	**0**	**40**	**32**	**0**	**228**	**$ 36,860.00**	**$ -**	**$ 36,860.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$ -**	**$ 36,860.00**
Task 6.0 - DISINFECTION CT STUDY UPDATE																														
		DISINFECTION CT STUDY UPDATE	4	12	24	40		60								24		164	$ 30,560.00		$ 30,560.00						$0.00	$ -	$ 30,560.00
Task 6.0 - DISINFECTION CT STUDY UPDATE			**4**	**12**	**24**	**40**	**0**	**60**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**164**	**$ 30,560.00**	**$ -**	**$ 30,560.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$ -**	**$ 30,560.00**
Task 7.0 - CONSTRUCTION SCHEDULE OPTIMIZATION WORKSHOP																														
		Project review workshop with potential bidders and construction schedule optimization sessions (5 in total)	8		24	40		40								24		136	$ 25,800.00		$ 25,800.00						$0.00	$ -	$ 25,800.00
Task 7.0 - CONSTRUCTION SCHEDULE OPTIMIZATION WORKSHOP			**8**	**0**	**24**	**40**	**0**	**40**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**136**	**$ 25,800.00**	**$ -**	**$ 25,800.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$ -**	**$ 25,800.00**
Task 8.0 - MEMBRANE PILOT STUDY																														
	8.1	Pilot Testing Protocol		24	24		60	80								12		200	$ 34,780.00		$ 34,780.00						$0.00	$ -	$ 34,780.00
	8.2	Pilot Plant Facilities Design Document Development and Start-up Assistance																										$ -		
		Pilot Plant Facilities Design Document Development		16	16	160		40						40	40	16		328	$ 61,840.00		$ 61,840.00						$0.00	$ -	$ 61,840.00
		Pilot Plant Facilities Start-up Assistance		32		32		40										104	$ 21,120.00		$ 21,120.00						$0.00	$ -	$ 21,120.00
	8.3	Pilot Operations		16			32	288										336	$ 46,544.00		$ 46,544.00						$0.00	$ -	$ 46,544.00
	8.4	Pilot Study Report		30	30		78	136								12		286	$ 48,218.00		$ 48,218.00						$0.00	$ -	$ 48,218.00
Task 8.0 - MEMBRANE PILOT STUDY			**0**	**118**	**70**	**192**	**170**	**584**	**0**	**0**	**0**	**0**	**0**	**40**	**40**	**40**	**0**	**1254**	**$ 212,502.00**	**$ -**	**$ 212,502.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$ -**	**$ 212,502.00**
Task 9.0 - ADDITIONAL SERVICE TASKS																														
	9.1	Geotechnical Engineering Supports during Design Phase (as needed)																0	$ -							$25,000.00	$25,000.00	$ 1,250.00	$ 26,250.00
	9.2	Subsurface Utilities Engineering (SUE, as needed)																0	$ -		$ 20,000.00						$0.00	$ -	$ 20,000.00
Task 9.0 - ADDITIONAL SERVICE TASKS			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**$ -**	**$ -**	**$ 20,000.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$25,000.00**	**$25,000.00**	**$ 1,250.00**	**$ 46,250.00**
Project Expenses including reproduction, deliveries, travel lodging, meal, mileage expenses, misc. pilot supplies, and any other direct costs as authorized by the City (Reimbursable Not to Exceed)																														
		Project Expenses including reproduction, deliveries, travel lodging, meal, and mileage expenses, and any other direct costs as authorized by the City (Reimbursable Not to Exceed)																		$ 54,400.00	$ 54,400.00	$7,880.00	$1,600.00	$19,581.00	$1,000.00		$30,061.00	$ 1,510.00	$ 85,971.00
TOTAL			**296**	**790**	**1614**	**1740**	**2886**	**3656**	**298**	**905**	**1213**	**60**	**240**	**2869**	**3574**	**772**	**48**	**20961**	**$3,422,877.00**	**$54,400.00**	**$3,497,277.00**	**$364,760.00**	**$297,320.00**	**$827,861.00**	**$110,053.00**	**$25,000.00**	**$1,624,994.00**	**$81,256.65**	**$5,203,529.00**

Estimated Project Expense Breakdown

Item	Unit Rate		Units	total
Internal Reproduction				
Working Documents Printing and Copies				
copies B&W	$ 0.10	per page	40000	$ 4,000
copies color	$ 0.75	per page	2000	$ 1,500
Full size drawing reproduction	$ 6.00	per page	400	$ 2,400
Half size drawings reproduction	$ 0.50	per page	9000	$ 4,500
Design Documents (Total internal)				
60%, 90%, TCEQ, Final Plans Deliverables	$ 0.50	per page	9600	$ 4,800
60%, 90%, TCEQ, Final Specs Deliverables	$ 0.20	per page	72000	$ 14,400
Plan Deliverables for Funding Agency Review (2 copies)	$ 0.50	per page	1200	$ 600
Spec Deliverables for Funding Agency Review (2 copies)	$ 0.20	per page	12000	$ 2,400
Trip Expense				
WTP Site Visit	$ 500.00	per trip	20	$ 10,000
TCEQ Meetings	$ 250.00	per trip	4	$ 1,000
WTP Pilot Visit	$ 500.00	per trip	8	$ 4,000
Misc. Pilot Test Supplies	$ 4,800.00		1	$ 4,800
			Total	**$ 54,400**

2021-June-03

Yue Sun, PE, BCEE
Project Manager
Ardurra Group, Inc.
2032 Buffalo Terrace
Houston, TX 77019

RE: **AACE Scope and Cost Proposal for Professional Mechanical/HVAC, Plumbing and Fire Protection Engineering Services for the Pflugerville WTP Expansion (PROJECT) for the City of Pflugerville, TX**

Dear Yue:

AACE is pleased to submit its Scope and Cost Proposal for providing Mechanical/HVAC, Plumbing and Fire Protection Professional Engineering Services for the Pflugerville WTP Expansion (PROJECT) for the city of Pflugerville (CITY), the Owner. AACE's role for the PROJECT shall be as a Sub-Consultant to Ardurra Group (ARDURRA), who is the Prime Engineering Consultant to the CITY. Attached please find our proposed Basic Services Scope, Additional Services, Compensation Fee and Schedule.

I. GENERAL

A. CITY has an existing 17 MGD WTP that it wishes to expand to30 MGD to meet future water demands.

B. CITY has contracted with ARDURRA to assist it with expanding the WTP, and ARDURRA has enlisted AACE as one of its subconsultants to handle the associated HVAC, plumbing and fire protection components of the PROJECT.

C. This PROJECT scope includes Detail Design and Bid Phase support services as a follow-up to a previous scope consisting of preliminary engineering design phase services. Construction phase support services are not included in this new scope and shall be done separately under a future, separate scope.

D. The Project Delivery method is anticipated to be traditional Design-Bid-Build.

II. BASIC PROFESSIONAL ENGINEERING SERVICES SCOPE includes:

A. DETAIL DESIGN SERVICES INCLUDE:

1) Start and complete the Engineering Drawings and Specifications (herein after referred to as Contract Documents) up to the 100% design level based on the CITY approved Preliminary Engineering Design work in our previous scope.

2) Design and drafting services for completing the Contract Drawings shall be based on AutoCAD 2D format consistent with ARDURRA and/or CITY's criteria.
3) Attend the Project Kickoff Meeting which is assumed will be Virtual.
4) Finalize detailed calculations, equipment selections and code review from the PER phase.
5) Produce work in accordance with the most current building codes adopted in the PROJECT area.
6) Site visits to PROJECT SITE as required to collect the necessary information so AACE can complete its design work scope.
7) Participate in weekly or bi-weekly coordination meetings via telephone conference calls as required with the ARDURRA Project Team.
8) Participate in one (1) meeting with Fire Marshal and Building Code Authorities Having Jurisdiction on the PROJECT area to present and confirm HPF design approach for the PROJECT. This meeting will be conducted 'in-person' or virtually, dependent on CITY covid restrictions.
9) Participate in one (1) 'in-person' monthly project progress meeting with ARDURRA and CITY at PROJECT Site (4 hours maximum per meeting).
10) Participate in two (2) 'in-person' discipline coordination meetings with ARDURRA Project Team at PROJECT Site (8 hours maximum per meeting).
11) Issue the Contract Documents to ARDURRA and CITY for review and comment at multiple milestones, specifically at the 60% and 90% Design phases. Electronic delivery to ARDURRA of the interim review sets of the Contract Documents shall be 11x17 size Drawings in Adobe Acrobat and specifications (8-1/2 x 11) in Adobe Acrobat format.
12) Internal QAQC by an experienced, senior Engineer of the Contract Documents.
13) Participate in Design Review Meetings with ARDURRA and CITY virtually, as needed, to review and exchange comments for each of the Design Submittal Milestones indicated above.
14) Respond to and incorporate ARDURRA and CITY comments from each project review milestone listed above into the Contract Document set.
15) Provide one (1) Final 'Issued for Bid' set of Contract Documents. Issued for Bid submittal shall consist of one (1) set of reproducible, signed and sealed, full-size Drawings and (1) set of Specifications in Microsoft Word format.
16) The 'Issued for Bid' set of Contract Documents shall be issued as one contract, and not split into separate 'Issued for Bid' packages.
17) Prepare, and submit to CITY, AACE's Opinion of Probable Construction Cost for the PROJECT scope at each project milestone listed above.

Anticipated Detail Design Phase Schedule

- *June 2021 – December 2021 (7 months)*

Preliminary AACE Drawing List

1. *H-1 GENERAL HVAC NOTES, ABBREVIATIONS, AND SYMBOLS*
2. *PL-1 GENERAL PLUMBING NOTES, ABBREVIATIONS, AND SYMBOLS*
3. *AH-1 LAKE RAW WATER PUMP STATION - DEMOLITION PLAN*
4. *AH-1 LAKE RAW WATER PUMP STATION - HVAC PLAN*
5. *APL-1 LAKE RAW WATER PUMP STATION - PLUMBING PLAN*
6. *BH-1 PRE-TREATMENT ELECTRICAL BUILDING - HVAC FLOOR PLAN*
7. *BH-1 PRE-TREATMENT ELECTRICAL BUILDING - HVAC FLOOR PLAN*

8. *CFP-1 MEMBRANE BUILDING - FIRE PROTECTION PLAN*
9. *CFA-1 MEMBRANE BUILDING - FIRE ALARM PLAN*
10. *CH-1 MEMBRANE BUILDING - DEMOLITION PLAN*
11. *CH-2 MEMBRANE BUILDING - HVAC PLAN*
12. *CH-3 MEMBRANE BUILDING - HVAC LOWER LEVEL PLAN*
13. *CH-4 MEMBRANE ELECTRICAL BUILDING - HVAC FLOOR PLAN*
14. *CPL-1 MEMBRANE BUILDING - PLUMBING PLAN*
15. *EH-1 HIGH SERVICE PUMP STATION 2- HVAC PLAN*
16. *EPL-1 HIGH SERVICE PUMP STATION 2- PLUMBING PLAN*
17. *FH-1 CHEMICAL FACILITY- HVAC PLAN*
18. *FH-2 CHEMICAL FACILITY- HVAC SCHEMATIC*
19. *FPL-1 CHEMICAL FACILITY- PLUMBING PLAN*
20. *FFA-1 CHEMICAL FACILITY – FIRE ALARM*
21. *GH-1 SLUDGE PUMP STATION ELECTRICAL BUILDING - HVAC FLOOR PLAN*
22. *H-2 EQUIPMENT SCHEDULES I*
23. *H-3 EQUIPMENT SCHEDULES II*
24. *H-3 EQUIPMENT SCHEDULES III*
25. *H-4 HVAC DETAILS I*
26. *H-5 HVAC DETAILS II*
27. *PL-2 EQUIPMENT SCHEDULES*
28. *PL-3 PLUMBING DETAILS*

B. BID PHASE SERVICES INCLUDE:

1) Issue Addenda information, including drawings, drawing exhibits and specifications, as necessary.
2) Issue necessary interpretations and clarifications of the Contract Documents related to AACE's work.
3) Assist ARDURRA and CITY with review of HVAC bids, as needed.
4) Provide ARDURRA an electronic copy of the signed and sealed 'Conformed' Contract Documents (Drawings in PDF and/or AutoCAD format, and specifications in PDF and/or MS Word format) at the conclusion of the bid phase, incorporating all Clarifications and Addendums issued during the Bidding period. In addition to the electronic sets, AACE shall provide hard copy sets of the 'Conformed' Contract Documents to CITY and the Contractor as noted below.

Anticipated Bid Phase Schedule

- *January 2022 – March 2022 (3 months)*

C. SERVICES NOT INCLUDED IN AACE'S SCOPE:

1) Construction phase support services.
2) As-building existing conditions.
3) Attending monthly project progress meetings in-person with ARDURRA and CITY, except as indicated above. AACE designated staff will be made available to participate via teleconference as required for any additional meetings needed.
4) Detailed studies or analyses.
5) Leadership in Energy and Environmental Design (LEED) services.

6) Generation of three-dimensional (3-D) drawings.
7) Mass reproduction of Contract Documents for bidding or other purposes.
8) Attend Pre-Bid Conference Meeting.

D. ASSUMPTIONS/CLARIFICATIONS:

1) The CITY shall provide RECORD DRAWINGS and SPECIFICATIONS, and O&M Manuals containing equipment cutsheets and TAB Reports, reflecting existing as-built conditions at the PROJECT site.
2) ARDURRA shall provide all criteria and full information as to its requirements for the Services, including design objectives and constraints, space, capacity and performance requirements, flexibility and expandability, and any budgetary limitations; and copies of all design and construction standards which the ARDURRA and/or CITY will require to be included in AACE's drawings and specifications. The ARDURRA and/or CITY shall make available to AACE all drawings, specifications, schedules and other information, interpretations and data prepared by the ARDURRA and/or CITY, or by others which ARDURRA and/or CITY and AACE consider pertinent to AACE's responsibilities hereunder. AACE shall be entitled to rely upon the completeness and accuracy of the information supplied by CITY and will have no obligation to check or verify that information.
3) ARDURRA or CITY will provide scanned electronic images (.pdf format) or AutoCAD files of CITY's existing drawings for AACE to utilize in the development of facility Drawings for the PROJECT.
4) CITY will make available plant personnel at each plant site to assist the AACE Project Team during its site assessment and data collection efforts.
5) Major design changes generated by CITY after the 60% Design Phase Milestone shall be considered an Additional Service. Major design changes are considered to be, but not limited to, addition of building structures; addition of square footage to project; addition of or major modifications to mechanical and electrical design preferences; changes in design concepts and methods; and major changes in equipment types.
6) AACE's Rough Order of Magnitude Construction Cost estimates are engineering estimates and are not warranted.

III. COMPENSATION FOR BASIC SERVICES

A. Compensation for labor of AACE Basic Services shall be on a Lump Sum basis and shall not exceed **$110,053** without ARDURRA's prior written approval. For the purposes of allocations of fee based on progress of work performed the proportion of AACE's fee for each customary phase is broken out as follows:

AACE Fee Breakdown	
1. Task 1.0 – General Project Management and QAQC:	*$17,000*
2. Task 2.0 – Final Design:	*$92,053*
3. Project Expenses:	*$1,000*

Compensation for AACE Basic Services includes overhead, communication charges (i.e. fax, telephone, email, and cell phone), travel to the project site for the number of site visits indicated herein, expedited shipping, courier services and computer usage.

IV. COMPENSATION FOR ADDITIONAL SERVICES

A. ARDURRA shall provide AACE with a written request for the Special Services, if such services become necessary. Written authorization must be obtained from ARDURRA prior to proceeding with Special Services required to support the activities in Basic Services.

V. TIME SCHEDULE

The time periods and rates for the performance of this work shall be valid from June 2021 to June 2022.

We appreciate you considering AACE for the opportunity to support you and the rest of the ARDURRA Team on this project. If you have any questions or comments, feel free to contact me.

Regards,

Ricardo J. Azcarate, P.E.
President
AACE, LLC

Scope of Services
Design and Bid Phase
Water Treatment Plant Expansion Project

Background

Ardurra Group, Inc. (Ardurra) and K Friese & Associates, Inc. (KFA) are completing the Preliminary Engineering Report (PER) for the City of Pflugerville (Client) Water Treatment Plant Expansion to 30.0 MGD (Project). KFA will provide design and bid phase engineering services for the Project as defined in the PER. The KFA scope for the Project generally includes the following:

- Engineering services for the design of the process mechanical components for the expansion of the Lake Pump Station to 33.7 million gallons per day (MGD), 6.0 MGD High Service Pump Station serving the 794' pressure zone and discharge header modifications at the existing High Service Pump Station and civil components of the stormwater drainage, stormwater detention, stormwater pollution prevention plans, and site pavement.
- Preparing design documents, including drawings and specifications, with submittals at 60%, 90% and 100%, for the items designed by KFA.
- Developing an engineer's opinion of probable construction cost (EOPCC) at 60% design level, updates at each milestone deliverable, including revised equipment pricing at each, for the items designed by KFA.
- Assisting Ardurra and the Client obtaining construction bids through a public bid phase.

The scope is limited to the Design and Bid Phases. A separate proposal and scope of services will be provided when the Project continues to construction and startup.

KFA's Scope of Services

A. Design Phase

The Scope of Services generally includes the following:

- Develop drawings at each submittal phase. A total of 44 drawings are estimated.
- Develop equipment specifications for the components designed by KFA.
- Develop an EOPCC for the components designed by KFA. KFA will provide formatting, edits and updates as requested by Ardurra for cohesiveness in estimates. EOPCC to be updated at each submittal milestone with updated vendor pricing.
- Support development and participate in one workshop at each of the 60% and 90% submittal phases.
- Support development and participate in 6 monthly meetings with Ardurra and the design team, one SCADA/I&C, one Building Coordination Meeting and one Site Civil Coordination Meeting.
- Participate in 2 meetings with Client OR, and other consultants who are currently working on the Elevated Storage Tank project, Weiss Lane/Pecan Street Water Lines project, and Generator project to coordinate design items throughout the project.
- Internal QA/QC review of all KFA work at various stages of progress as well as review of all deliverables to Ardurra.
- KFA will follow Ardurra's QA/QC quality program and edit designs per mutually agreeable recommendations from Ardurra reviewers.

The Scope of Services and Fee are based on the following assumptions.

- The design is based on the decisions made during the Preliminary Engineering Phase.
- KFA will provide professional engineering services for the process mechanical design and civil design of the items listed in the Scope of Services. Other design disciplines, such as architectural, electrical, instrumentation, structural, geotechnical, environmental, survey, plumbing, and HVAC (Disciplines) will be conducted by Ardurra or a subconsultant contracted by Ardurra.
- Process piping will be designed to a point approximately five feet from the edge of the basin. Piping beyond this limit will be considered yard piping and designed by Ardurra.
- KFA will prepare the lower portion of the Piping & Instrumentation Diagram drawings that includes the equipment and piping. The upper portion and control will be prepared by the instrumentation engineer.
- Pipe stress analysis, if required, will be conducted by Ardurra or a specialized subconsultant contracted by Ardurra.
- Distribution system modeling required to determine surge control requirements will be conducted by the Client.
- KFA will coordinate with other design disciplines as required.
- KFA assumed two people will attend the client meetings in person.
- KFA assumed three people will attend the design team meetings in a virtual online setting.
- KFA assumed three people will attend the SCADA Workshop in person with a meeting duration of less than 4 hours. The meeting will be in Austin or Pflugerville.
- KFA assumed three people will attend the Submittal Workshop in person with a meeting duration of less than 4 hours. The meeting will be in Austin or Pflugerville.
- Drawings will be developed in 2D versions of AutoCAD.
- KFA will prepare specifications in Microsoft Word for the major equipment associated with the components design by KFA. Specifications for contract requirements, general requirements, and general plant components, will be prepared by Ardurra.
- EOPCC at the 100% submittal will be comparable to a Class 2 estimate as defined by the Association for the Advancement of Cost Engineering.
- The EOPCC is not a guarantee of construction cost and can vary due to a variety factors beyond the control of KFA.
- Deliverables to Ardurra will be electronic in searchable pdf format. Ardurra will assemble and submit to Client and all applicable permitting agencies. KFA will participate in meetings with permitting entities to review the design conducted by KFA.
- One submittal for QC review will be provided to Ardurra prior to the submittal for the Client.
- Work conducted by KFA will be sealed by an engineer registered in the State of Texas.
- The anticipated drawing list is provided in the Table 1. The level of detail of each drawing will be advanced at each submittal.

Table 1: Drawing List

Drawing	Notes
Lake Pump Station Drainage Plan	1
Lake Pump Station Detention Pond Plan and Sections	2
WTP Overall Drainage Plan	1
WTP Drainage Plan Calculations	1
WTP Enlarged Drainage Plan I	2
WTP Enlarged Drainage Plan II	2
WTP Enlarged Drainage Plan III	2
WTP Enlarged Drainage Plan IV	2
WTP Detention Pond I Plan and Sections	1
WTP Detention Pond II Plan and Sections	1
Lake Pump Station Paving Plan	1
WTP Overall Paving Plan	1
WTP Enlarged Paving Plan I	1
WTP Enlarged Paving Plan II	1
WTP Enlarged Paving Plan III	1
WTP Enlarged Paving Plan IV	1
WTP Paving Profiles I	2
WTP Paving Profiles II	2
WTP Paving Profiles III	2
Paving Details I	1
Paving Details II	1
Drainage Details I	1
Lake Pump Station SWPPP	1
WTP Site SWPPP	1
SWPPP Details I	2
SWPPP Details II	2
Lake Pump Station Existing Plan View	1
Lake Pump Station Upper Plan View	1
Lake Pump Station Lower Plan View	1
Lake Pump Station Section View	1
Lake Pump Station Details	1
High Service Pump Station Existing Plan View	1
High Service Pump Station Demo Plan and Section	1
High Service Pump Station Header Modification Plan View	1
High Service Pump Station Header Modification Sections	1
High Service Pump Station Header Modification Details	1
High Service Pump Station Upper Plan View	1
High Service Pump Station Lower Plan View	1
High Service Pump Station Section View	1
High Service Pump Station Details	1
Lake Pump Station Pump 4 P&ID	1, 3
Lake Pump Station Pump 5 P&ID 1	1, 3
High Services Pump Station Pump 5 P&ID 1	1, 3
High Services Pump Station Pump 6 P&ID 1	1, 3

Drawing List Notes

1. Included in 60% Submittal.
2. Included in 90% Submittal.
3. KFA will prepare the piping and process portion. Instrumentation engineer will prepare the signal and control portion.

B. Bid Phase and Conformed Documents

KFA will assist Ardurra throughout the Bid Phase. The Scope of Services generally includes the following:

1. Interpret plans and specifications and answer questions submitted by potential bidders.
2. Prepare addenda responses as necessary.
3. Develop conformed construction documents that incorporate changes made during the Bid Phase.

The Scope of Services and Fee are based on the following assumptions.

a) Advertising the project will be conducted by others.
b) Attendance at the Prebid meeting is not required.
c) Attendance at the bid opening is not required.
d) Bid evaluation and contractor evaluation will be conducted by Ardurra.

C. Project Management and Controls

Oversight of the KFA team, monitoring budgets and schedules, communications, and other tasks directly associated with the Project.

Basic Services Schedule

The level of effort is based on a schedule appropriate for the design, at least six months. Internal milestones will be in advance of the dates presented and subject to specification by Ardurra design team. Expectation is that all process mechanical design is complete 2-3 weeks prior to internal QA/QC dates to facilitate work by other disciplines and meet QA/QC schedules.

Fee

KFA will conduct the Scope of Services in accordance with the Scope Assumptions for a lump sum fee of $364,760. Table 2 provides a breakdown of the fee.

Table 2: Basic Services Fee Summary

Phase	Fee
Project Management and Quality Control	$29,040
Final Design	
60% Design Development	$190,050
90% Design Development	$73,100
100% Design Development	$29,240
Permitting	$6,020
Bid Phase & Conformed Documents	$28,370
Coordination Meetings with other Consultants	$1,060
Expenses	$7,880

KFA's Scope of Supplemental Services

A. Major Equipment Preselection and Procurement

KFA will assistance with the preselection and procurement of the process mechanical equipment. It is anticipated the procurement process will occur near the 60% design submittal. The Scope of Services generally includes the following:

1. Assist with the preparation of the procurement package, including drawings and specifications.
2. Attend the pre-submittal conference.
3. Interpret plans and specifications and answer questions submitted by potential equipment suppliers.
4. Prepare addenda responses, as necessary.
5. Assist with the evaluation of the equipment proposals.

The Scope of Services and Fee are based on the following assumptions.

a) KFA will prepare specifications for the major equipment associated with the components designed by KFA. Specifications for contract requirements, general requirements, and general plant components, will be prepared by Ardurra.

Supplemental Services Fee

KFA will conduct the Scope of Supplemental Services in accordance with the Scope Assumptions for a lump sum fee of $16,000 for each equipment type preselected. The services will be authorized individually for each preselected equipment type.

KFA FEE SCHEDULE
DESIGN DEVELOPMENT AND BID PHASE
ARDURRA
WTP EXPANSION PROJECT

	Task	Technical Advisor / Quality Consultant	Senior Project Manager	Technical Lead	Senior Engineer	Graduate Engineer	Designer 2D CAD	General Office Clerk Hours	Total Labor	KFA Total Labor Cost	Expenses	Total Cost
		$ 275.00	$ 265.00	$ 265.00	$ 200.00	$ 125.00	$ 120.00	$ 90.00				
A. Design Development Phase		*24*	*0*	*256*	*318*	*612*	*709*	*24*	***1943***	***$301,780***	***$6,930***	***$308,710***
1	Drawings								0	$0	$0	$0
	Lake Pump Station Drainage Plan			4	4	8	16		32	$4,780	$100	$4,880
	Lake Pump Station Detention Pond Plan and Sections			4	4	8	16		32	$4,780	$100	$4,880
	WTP Overall Drainage Plan			4	4	12	18		38	$5,520	$110	$5,630
	WTP Drainage Plan Calculations			4	4	16	18		42	$6,020	$120	$6,140
	WTP Enlarged Drainage Plan I			4	4	12	18		38	$5,520	$110	$5,630
	WTP Enlarged Drainage Plan II			4	4	12	18		38	$5,520	$110	$5,630
	WTP Enlarged Drainage Plan III			4	4	12	18		38	$5,520	$110	$5,630
	WTP Enlarged Drainage Plan IV			4	4	12	18		38	$5,520	$110	$5,630
	WTP Detention Pond I Plan and Sections			4	4	12	18		38	$5,520	$110	$5,630
	WTP Detention Pond II Plan and Sections			4	4	8	18		34	$5,020	$100	$5,120
	Lake Pump Station Paving Plan			4	4	8	16		32	$4,780	$100	$4,880
	WTP Overall Paving Plan			4	4	8	15		31	$4,660	$90	$4,750
	WTP Enlarged Paving Plan I			4	4	8	15		31	$4,660	$90	$4,750
	WTP Enlarged Paving Plan II			4	4	8	15		31	$4,660	$90	$4,750
	WTP Enlarged Paving Plan III			4	4	8	15		31	$4,660	$90	$4,750
	WTP Enlarged Paving Plan IV			4	4	8	15		31	$4,660	$90	$4,750
	WTP Paving Profiles I			4	4	8	16		32	$4,780	$100	$4,880
	WTP Paving Profiles II			4	4	8	16		32	$4,780	$100	$4,880
	WTP Paving Profiles III			4	4	8	16		32	$4,780	$100	$4,880
	Paving Details I			4	4	8	12		28	$4,300	$90	$4,390
	Paving Details II			4	4	8	12		28	$4,300	$90	$4,390
	Drainage Details I			4	4	8	16		32	$4,780	$100	$4,880
	Lake Pump Station SWPPP			4	4	12	14		34	$5,040	$100	$5,140
	WTP Site SWPPP			4	4	12	14		34	$5,040	$100	$5,140
	SWPPP Details I			2	2	4	8		16	$2,390	$50	$2,440
	SWPPP Details II			2	2	4	8		16	$2,390	$50	$2,440
	Lake Pump Station Existing Plan View			4	8	16	22		50	$7,300	$150	$7,450
	Lake Pump Station Upper Plan View			4	8	16	22		50	$7,300	$150	$7,450
	Lake Pump Station Lower Plan View			4	8	16	22		50	$7,300	$150	$7,450
	Lake Pump Station Section View			4	8	16	22		50	$7,300	$150	$7,450
	Lake Pump Station Details			4	4	8	22		38	$5,500	$110	$5,610
	High Service Pump Station Existing Plan View			4	8	16	22		50	$7,300	$150	$7,450
	High Service Pump Station Demo Plan and Section			4	8	16	22		50	$7,300	$150	$7,450
	High Service Pump Station Header Modification Plan			4	8	16	22		50	$7,300	$150	$7,450
	High Service Pump Station Header Modification			4	8	16	22		50	$7,300	$150	$7,450
	High Service Pump Station Header Modification Details			4	8	16	22		50	$7,300	$150	$7,450
	High Service Pump Station Upper Plan View			4	8	16	22		50	$7,300	$150	$7,450
	High Service Pump Station Lower Plan View			4	8	16	22		50	$7,300	$150	$7,450
	High Service Pump Station Section View			4	8	16	22		50	$7,300	$150	$7,450
	Lake Pump Station Pump 4 P&ID			3	4	6	6		19	$3,065	$60	$3,125
	Lake Pump Station Pump 5 P&ID 1			3	4	6	6		19	$3,065	$60	$3,125
	High Services Pump Station Pump 5 P&ID 1			3	4	6	6		19	$3,065	$60	$3,125
	High Services Pump Station Pump 6 P&ID 1			3	4	6	6		19	$3,065	$60	$3,125
3	Specifications & Equipment Coordination			12	24	36		16	88	$13,920	$700	$14,620
4	Engineer's Opinion of Probable Construction Cost			12	16	40			68	$11,380		$11,380
5	Permitting Meetings (4)			8	12	12			32	$6,020	$800	$6,820
6	Submittal Workshops (2)			12		24			36	$6,180	$450	$6,630
7	Ardurra Coordination Meetings (9)			18		18			36	$7,020		$7,020
8	KFA Team Coordination Meetings (18)			18	18	18			54	$10,620		$10,620
9	Coordination Meetings with other City Projects (2)			4					4	$1,060		$1,060
10	Quality Assurance / Quality Control	24		8	32			8	72	$15,840	$320	$16,160
B. Bid Phase		*4*	*0*	*28*	*20*	*56*	*56*	*4*	***168***	***$26,600***	***$450***	***$27,050***
1	Prebid Meeting			6					6	$1,590	$300	$1,890
2	Respond to Contractor's Questions			7	8	16			31	$5,455	$50	$5,505
3	Prepare Addenda	2		8	12	16	24	4	66	$10,310	$50	$10,360
4	Conformed Documents	2		7		24	32		65	$9,245	$50	$9,295
C. Project Management & Controls		*0*	*96*	*0*	*0*	*0*	*0*	*34*	***130***	***$28,500***	***$500***	***$29,000***
1	Design Development Drawings		90					32	122	$26,730	$500	$27,230
2	Bid Phase		6					2	8	$1,770		$1,770
	Base Services Totals	**28**	**96**	**284**	**338**	**668**	**765**	**62**	**2241**	**$356,880**	**$7,880**	**$364,760**

City of Pflugerville Surface Water Treatment Plant Expansion Project
Final Design and Bidding Phases
Electrical Engineering Project Scope

1. Overview and Understanding:

This project will provide the 39 MGD Expansion Project detailed design and the advertisement/bidding phase services (Project) for the City of Pflugerville (Owner) Surface Water Treatment Plant (Plant). Gupta & Associates, Inc. (GAI) will perform both the electrical distribution and controls (ED&C) design as a subconsultant to Ardurra.

1.1. Project Description

1.1.1. Lake Pump Station

1. Two new vertical turbine pumps will be installed with soft starters.
2. The existing valve actuators will be replaced with new electric actuators.
3. A copper ion generator system will be installed.
4. The Lake Raw Water Pump Station Building and Electrical Room will be expanded.

1.1.2. Surface Water Treatment Plant

1. The Pretreatment System (i.e. Rapid Mix, Flocculation Basins, Plate Settlers):
   a. Aluminum chlorohydrate (ACH) coagulation with static mixers, three-stage flocculation basins, and sedimentation basins with plate settlers.
   b. Four trains with one static mixer to serve two trains for chemical coagulation. Sludge produced from each train will be collected via chain and flight sludge collectors.
   c. A Pretreatment Electrical Building.
2. Membrane Filtration:
   a. New membrane feed pumps & strainers, submersible membrane filtration units, permeate pumps.
   b. New chemical clean-in-place (CIP)/neutralization system with CIP tank, CIP feed pumps, CIP chemical storage and feed equipment, CIP waste neutralization tank and pumps, and associate piping.
   c. New backwash system with backwash pumps, air scour blowers and associated piping.
   d. A Membrane Electrical Building.
3. Chlorine Contact Basin:
4. High Service Pump Station:
   a. A new High Service Pump Station (HSPS No. 2) with two vertical turbine pumps and VFDs.
   b. The new HSPS will include an Electrical Room.
5. Chemical Storage and Feed Facility:
   a. Demolishing existing chemical system including ACH coagulant, liquid ammonium sulfate, onsite hypochlorite generation, and the abandoned PAC equipment.
   b. A new chemical bulk storge and feed facility with outdoor bulk storage tanks to house bulk delivered sodium hypochlorite, liquid ammonium sulfate, coagulant, and individual chemical metering pump rooms inside the Chemical Building.
   c. The Chemical Building will have an Electrical Room.
6. The Solids and Residual Liquid Handling System:
   a. A Raw Sludge Splitter Box, new sludge Gravity Thickeners and Thickened Sludge Pump Station.
   b. A new Backwash Waste Clarifier and Recycle Pump Station.
   c. A Solids Handling Electrical Building.
7. Miscellaneous Improvements:
   a. New electrical distribution switchgear inside the proposed Main Electrical Building.
   b. A second 2250 kW generator.

1.2. Design Phase Services

1.2.1. 60% Design Development Phase

1. The 60% design review submittal will generally consist of:
   a. Overall site plans of major load areas including main ductbanks to padmount transformers.
   b. Floor plans of electrical rooms.
   c. One-Line Diagrams down to the 480V motor control centers (MCCs);

i. Including wire/conduit sizing and ductbank routing for feeder circuits
ii. Not including wire/conduit sizing for branch circuits

d. All drawings from 30% (more fully developed).
e. Building interior lighting, instrumentation, and power layouts.
f. Grounding.
g. Area Lighting.
h. Ductbank routing.
i. Light fixture schedules.
j. 480V panel schedules.
k. Instrumentation panel details.
l. General installation details.
m. GAI will provide PDF copies of the plan drawings for the design review submittal:
   i. The design review submittal process will consist of an initial quality check set of documents sent to Ardurra for internal review.
   ii. Ardurra review comments will be incorporated into the design documents and then resubmitted to Ardurra for submittal to the Owner.
   iii. A response to each Owner review comment from the 30% submittal will be addressed in a spreadsheet format and correspondingly incorporated into the design package for the next submittal.

2. Preliminary construction specifications for major pieces of equipment such as:
   a. Switchgear and MCCs.
   b. Padmount transformers.
   c. Medium voltage motors.
   d. Medium voltage equipment.
   e. Motor control centers.
   f. Standby generator and related switchgear.

3. Anticipated design elements will include:
   a. Standby generator design.
   b. Overall electrical distribution system showing main switchgear, major load centers, electrical rooms, etc.
   c. Development of 60% ED&C opinion of probable construction costs (OPCC).

1.2.2. 90% Development Phase

1. The 90% design review submittal will generally consist of:
   a. Plan drawings that incorporate Owner review comments from the 60% design review submittal and to be considered complete except for incorporating final review comments. Drawings will include:
      i. All drawings from 60% (more fully developed)
      ii. Riser Diagrams.
      iii. PLC Interface Diagrams.
      iv. Low voltage (120V) panel schedules.
      v. Schematics.
   b. Full set of construction specifications provided in PDF format and Microsoft Word files.
   c. Additional anticipated design elements will include:
      i. Branch circuit wiring/conduit sizing.
      ii. Ductbank sections
   d. Development of 90% ED&C OPCC.
   e. A response to each Owner review comment from the 90% submittal will be addressed in a spreadsheet format and correspondingly incorporated into the design package for the next submittal.

2. The 90% design effort will include development of a preliminary power study for purposes of determining the available short circuit duties and potential arc flash hazards. The final power

system study is to be provided by the Construction Contractor to include final protective device coordination and arc flash labeling.

3. The 90% design review submittal will be provided as a sealed and signed set for permitting (TCEQ) purposes (not for advertisement).

3.1.1. Final Design Development Phase

1. The bid ready set of plans will be signed and sealed full-sized PDF format (plans and specs), Microsoft Word files (specifications) and AutoCAD files (drawings).
2. A final OPCC will be provided.

3.1.2. Membrane Preselection and Procurement

1. GAI will prepare technical specifications and associated drawings and figures necessary for the pre-selection of membrane elements and associated equipment to be provided for the plant expansion.
2. These plans and specifications will be an early delivery of the plans and specifications being developed for the Membrane Facility. No unique design elements are intended. The level of effort is associated with the duplicated submittal process, additional reviews, and production.

1.2.3. Workshops

GAI will provide the following:

1. Participation in the Project Kickoff Meeting.
2. Participation in two in-person Design Progress Meetings with the Owner.
3. Participation in six Design Progress Conference Calls with the Owner.
4. Participation in eight Design Team Coordination Conference Calls.
5. Participation in one-day Design Review Meetings with the internal reviewers after the 60% and 90% Submittals.
6. Participation in four-hour Design Review Meetings with the Owner after the 60% and 90% Submittals.

1.2.4. Design Clarifications

GAI requests the following:

1. All civil, mechanical, and structural reference files to be provided to GAI for incorporation into the design documents.
2. GAI will provide internal quality reviews prior to each submittal. However, recognizing that the input to GAI's design effort is dependent upon other disciplines, adequate time is required between modifications by other disciplines and submittal milestones to allow GAI to perform these quality reviews. A minimum of two weeks is requested during which no further changes to reference files, HP sizing, etc. will be incorporated.
3. Equipment load lists to be provided by Ardurra to include:
   a. Motor HP sizes, control means (constant versus variable speed), and RPM.
   b. Motorized valves HP sizes and control means (open/close versus modulating).
   c. Which loads are to be backed up by generator including how many are expected to run on the generator at any one time.
4. Manufacturer shop drawing submittals to be provided for major equipment packages such as blowers, screens, washer/compactors, conveyors, etc.
5. Equipment tagging convention to be defined by Ardurra and assigned by Ardurra to mechanical equipment. GAI will assign equipment tags to ED&C equipment based upon the provided convention.
6. Ardurra to provide construction specification format template and design drawing formats.
7. OPCCs are engineering estimates and are not warranted. Ardurra to provide the format for developing OPCCs.
8. A preliminary sheet listing is attached.

1.3. Advertisement/Bidding Phase

GAI will provide the following:

1. Provide sealed and signed plans and specifications to Ardurra (Ardurra will incorporate these documents into the overall project documents and handle all advertisement, receipt of bids, and opening of bids).
2. Participate in two pre-bid meetings.
3. Respond to Bidders' requests for information (RFIs), issue addenda as required, and provide conformed documents in PDF format and Microsoft Word files.

2. Administrative

2.1. Schedule

This work will include the following administrative services:

1. GAI will provide monthly invoicing for this work to Ardurra. The duration of this Project is expected to be:
   a. Final Phase: 6 months
   b. Advertisement and Bidding Phase: 2 months
2. GAI will conduct site surveys after notice to proceed is received as needed.

2.2. Fee:

GAI will perform these services on a fixed fee basis, based upon the following:

Phase	ED&C	ODC	Total
Project Management	$31,950	$1,821	$33,771
60% Design Phase	$429,426	$8,985	$438,411
90% Design Phase	$214,713	$4,493	$219,206
100% Design Phase	$71,571	$1,498	$73,069
Advertisement/Bidding Phase	$27,520	$1,071	$28,591
Membrane Preselection	$6,540	$131	$6,671
Power Study	$26,560	$1,582	$28,142
Total	$808,280	$19,581	$827,861

2.3. Clarifications:

The following items apply to this proposal:

1. GAI has not included any software licenses or hardware in this proposal.
2. This proposal is valid for 60 days.
3. This proposal is based upon the issuance of an amendment to the existing subconsultant agreement between Ardurra and GAI.

Preliminary Sheet Listing

Sheet No.	Sheet Title
	General Sheets
00-E-01	Legend & Symbols - I
00-E-02	Legend & Symbols - II
00-E-03	General Notes
00-E-04	Light Fixture Schedule
00-E-05	Electrical Standard Details-1
00-E-06	Electrical Standard Details-2
00-E-07	Electrical Standard Details-3
00-E-08	Electrical Standard Details-4
00-E-09	Electrical Standard Details-5
	Raw Water Pump Station
10-E-01	Electrical Site Plan
10-E-02	Electrical Duct Bank Section & Details
10-E-03	Existing One Line Diagram
10-E-04	Proposed One Line Diagram
10-E-05	Generator One Line Diagram
10-E-06	Electrical Room Layout
10-E-07	Expanded Room Layout
10-E-08	Pump Station Electrical Plan
10-E-09	Pump Station HVAC + Lighting
10-E-10	MCC Elevation View and Panel Schedule
10-E-11	Copper Ion Generator Plan & Details
10-E-12	Pump Station Details
10-E-13	PLC Interface Diagram
10-E-14	Electrical Schematic-1
10-E-15	Electrical Schematic-2
	Plant - Site
20-E-01	Electrical Site Plan-1
20-E-02	Electrical Site Plan-2
20-E-03	Electrical Site Plan-3
20-E-04	Electrical Site Plan-4
20-E-05	Electrical Duct Bank Sections
20-E-06	Electrical Duct Bank Sections
20-E-07	Site Lighting Plan & Details
20-E-08	Site Security Gate Entrance Plan & Details
20-E-09	Generator Area Plan & Details
20-E-10	Incoming Power and Details
20-E-11	Plant Overall Electrical Riser Diagram
20-E-12	Overall One-Line Diagram-1
20-E-13	Overall One-Line Diagram-2
20-E-14	Switchgear Electrical Building Layout
20-E-15	Switchgear Elevation and Additions

Sheet No.	Sheet Title
20-E-16	Generator Paralleling Switchgear One Line Diagram
20-E-17	Generator System Conduit Riser Diagram
20-E-18	Generator Interface
20-E-19	Grounding Plan
20-E-20	Fiber Riser Diagram
	Pretreatment Plan
30-E-01	Enlarged Electrical Site Plan
30-E-02	Electrical One Line Diagram-1
30-E-03	Electrical One Line Diagram-2
30-E-04	MCC Elevation View and Panel Schedule
30-E-05	Electrical Building Power Plan
30-E-06	Electrical Building Grounding
30-E-07	Electrical Building Lighting & Controls Plan
30-E-08	Basin Plan & Grounding
30-E-09	Basin Lighting Plan
30-E-10	Flocculation Basin Electrical Plan
30-E-11	Flocculation Basin Electrical Details
30-E-12	Sedimentation Basin Electrical Plan
30-E-13	Sedimentation Basin Electrical Details
30-E-14	Sludge withdraw/ Splitter Box Electrical
30-E-15	Section & Details
30-E-16	Electrical Interface Diagram-1
30-E-17	Electrical Interface Diagram-2
30-E-18	Electrical Schematic-1
30-E-19	Electrical Schematic-2
30-E-20	Electrical Schematic-3
	Membrane Plant
40-E-01	Enlarged Electrical Site Plan
40-E-02	Existing MCC One Line Diagram Demo-1
40-E-03	Existing MCC One Line Diagram Demo-2
40-E-04	MCC Elevation & Details
40-E-05	Membrane Building Floor Plan Demo
40-E-06	Electrical Room Demolition Plan
40-E-07	Chemical Area Demolition
40-E-08	Panel Board Demolition
40-E-09	Demolition Pictures-1
40-E-10	Demolition Pictures-2
40-E-11	MCC One Line Diagram-1
40-E-12	MCC One Line Diagram-2
40-E-13	MCC Elevation & Details
40-E-14	Membrane Building Electrical Floor Plan-1
40-E-15	Membrane Building Electrical Floor Plan-2
40-E-16	Membrane Building Instrumentation Plan

Sheet No.	Sheet Title
40-E-17	Membrane Building Instrumentation Plan
40-E-18	Membrane Building HVAC Electrical Plan
40-E-19	Membrane Building Lighting Plan
40-E-20	Membrane Building Section and Details
40-E-21	CIP & Neutralization Area Electrical Plan
40-E-22	CIP & Neutralization Area Electrical Details
40-E-23	Air Scour Blower Area Electrical Plan
40-E-24	Air Scour Blower Area Electrical Details
40-E-25	Backwash Pump Area Electrical Plan
40-E-26	Membrane System Riser Diagram-1
40-E-27	Membrane System Riser Diagram-2
40-E-28	Electrical Room Electrical Plan
40-E-29	Electrical Room Control Plan
40-E-30	PLC Interface Diagram-1
40-E-31	PLC Interface Diagram-2
40-E-32	PLC Interface Diagram-3
40-E-33	Electrical Schematics-1
40-E-34	Electrical Schematics-2
40-E-35	Electrical Schematics-3
40-E-36	Electrical Schematics-4
	Chlorine Contact Basin
50-E-01	Chlorine Contact Basin Electrical Plan
50-E-02	Chlorine Contact Basin Electrical Details
	High Service Pump Station-Existing
60-E-01	Existing Pump Station One-Line Diagram Demolition
60-E-02	Existing Pump Station One-Line Diagram Modification
60-E-03	Existing Pump Station Pictures
60-E-04	Existing Pump Station Switchgear Elevation and Details
	New High Service Pump Station
70-E-01	Enlarged Electrical Site Plan
70-E-02	Electrical One-Line Diagram-1
70-E-03	Electrical One-Line Diagram-2
70-E-04	Switchgear & MV MCC One-Line Diagram
70-E-05	480V Panel Board One-Line Diagram
70-E-06	Electrical Room Electrical Plan
70-E-07	Electrical Room Control Plan
70-E-08	Electrical Room Lighting Plan
70-E-09	Pump Station Electrical Plan
70-E-10	Pump Station Instrumentation Plan
70-E-11	Pump Station Lighting Plan
70-E-12	Pump Station HVAC Plan
70-E-13	Pump Station Grounding Plan

Sheet No.	Sheet Title
70-E-14	Electrical Riser Diagram-1
70-E-15	Electrical Riser Diagram-2
70-E-16	PLC Interface Diagarm-1
70-E-17	Electrical Schematics-1
70-E-18	Electrical Schematics-2
70-E-19	Electrical Schematics-3
	Solids
80-E-01	Enlarged Electrical Site Plan
80-E-02	Electrical MCC One-Line Diagram Demo-1
80-E-03	Electrical MCC One-Line Diagram Demo-2
80-E-04	MCC Elevation & Details
80-E-05	Electrical Room Electrical Plan
80-E-06	Electrical Room Control Plan
80-E-07	Electrical Room Lighting Plan
80-E-08	Gravity Thickener Electrical Plan
80-E-09	Sludge Pump Station Electrical Plan
80-E-10	Gravity Thickener Area Riser Diagram
80-E-11	Waste Clarifier Electrical Plan
80-E-12	Recycle Pump Station Electrical Plan
80-E-13	Recycle Pump Station Section & Details
80-E-14	PLC Interface Diagram
80-E-15	Electrical Schematics-1
80-E-16	Electrical Schematics-2
80-E-17	Electrical Schematics-3
	Chemical Building
90-E-01	Enlarged Electrical Plan
90-E-02	Overall Electrical Plan
90-E-03	Overall Electrical Grounding Plan
90-E-04	Outdoor Chemical Storage Tanks Electrical Plan
90-E-05	Outdoor Chemical Storage Tanks I&C Plan
90-E-06	Chemical Storage Riser Diagram-1
90-E-07	Chemical Storage Riser Diagram-2
90-E-08	Chemical Storage Lighting Plan
90-E-09	Chemical Storage Eye Wash Plan
90-E-10	Chemical Room-1 Electrical Plan
90-E-11	Chemical Room-1 Riser Diagram & Details
90-E-12	Chemical Room-2 Electrical Plan
90-E-13	Chemical Room-2 Riser Diagram & Details
90-E-14	Chemical Room-3 Electrical Plan
90-E-15	Chemical Room-3 Riser Diagram & Details
90-E-16	Chemical Room-4 Electrical Plan
90-E-17	Chemical Room-4 Riser Diagram & Details
90-E-18	Chemical Building HVAC

Sheet No.	Sheet Title
90-E-19	Chemical Building HVAC Riser Diagram
90-E-20	Electrical Room Electrical Plan
90-E-21	Electrical Room Control Plan
90-E-22	Electrical Room Lighting Plan
90-E-23	PLC Interface Diagram-1
90-E-24	PLC Interface Diagram-2
90-E-25	PLC Interface Diagram-3
90-E-26	Electrical Schematics-1
90-E-27	Electrical Schematics-2
90-E-28	Electrical Schematics-3
90-E-29	Electrical Schematics-4

MBROH

13601 Preston Road., Suite 900W | Dallas, TX 75240 | tel 972.364.9090 | fax 972.364.9091 | www.mbroh.com

July 2, 2021

Yue Sun, P.E.
Project Manager
Ardurra
2032 Buffalo Terrace
Houston, TX. 77019

RE: City of Pflugerville – Water Treatment Plant (WTP) Expansion

Dear Ms. Sun:

Thank you for the opportunity to provide our Scope of Work and Level of Effort (LOE) for the City of Pflugerville WTP Expansion Project.

The task below describes the SCADA Engineering Services to be provided by Mbroh Engineering, Inc. for the final design engineering effort:

Task 1: Project Management

- Project Progress Meetings and Calls
- Project Team Coordination
- Quality Assurance/ Quality Control
- City/OR Review Meetings

Task 2: Final Design:

- 60 Percent Plans, Specifications and OPCC
- 90 Percent Plans, Specifications and OPCC
- Coordination with TCEQ and TDLR
- City Building Permit Review
- Final Bid-Ready Plans, Specifications, and 100% OPCC
- Bidding Phase Support and Conformed Documents
- Coordination Meetings with OR and Other Consultants

Task 3: Membrane Pre-Selection Proposal Documents

- Prepare Pre-Selection Proposal Documents
- Membrane Pre-Selection Process Assistance
- Membrane Pre-Selection Evaluation
- Membrane System Design Modification Allowance

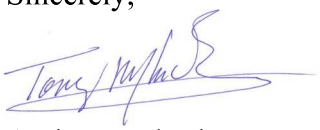
Please find the attached the LOE Spreadsheet for the proposed Professional Services fee of **$297,320.00**.

MBROH

13601 Preston Road., Suite 900W | Dallas, TX 75240 | tel 972.364.9090 | fax 972.364.9091 | www.mbroh.com

If you should have questions, please feel contact me at (972) 364-9090.

Sincerely,



Anthony Mbroh, P.E.
President

City of Pflugerville			**Labor Classifications**								**Non-Labor Fee**		
Water Treatment Plant Expansion			**Hours**								**Non-Labor**		
Level Of Effort Spreadsheet			$200	$185	$120	$75							1.00
			PM	**Sr**	**Sr**	**Sr**							
			Principal	**I&C**	**CAD**	**Adm**	**Total**	**Infl**	**Labor**				**Sub-**
Task Description							**Hours**	**Fact**	**Fee**	**Repro**	**Trav**	**Deliver**	**Total**
Phase 2 - Basic Design (60% - 100%)							0	0.0%	0				0
1.0		**Project Management**											
1.1		Project Execution Plan and Kick-off Meeting	4	4			8		1,540				0
1.2		Site Visits	24	24			48		9,240		1,600		1,600
1.3		Monthly Progress Report/Invoices	40			80	120		14,000				0
1.4		QA/QC	16				16		3,200				0
		Subtotal	*84*	*28*	*0*	*80*	*192*	*0*	*27,980*	*0*	*1,600*	*0*	*1,600*
2.0		**Meetings**											
2.1		Monthly Progress/Coordination Meetings	40	40		8	88		16,000				0
2.2		Submittal Review Meeting (60%, 90%, 100%)	24	24		16	64		10,440				0
2.3		Vendor Meetings	24	24			48		9,240				0
2.4		System Integrator Meetings	8	24			32		6,040				0
		Subtotal	*96*	*112*	*24*	*24*	*232*	*0*	*41,720*	*0*	*0*	*0*	*0*
3.0		**Network / Communications**											
3.1		System Architecture	8	16	40		64		9,360				0
3.2		Redundant Network	8	16	16		40		6,480				0
3.3		Network Cabinet layout Details	8	16	20		44		6,960				0
3.4		PLC Details (Large/Small)	8	16	20		44		6,960				0
		Subtotal	*32*	*64*	*96*	*0*	*192*	*0*	*29,760*	*0*	*0*	*0*	*0*
4.0		**P&ID Design and Development**											
4.1		Plant Overview Block Diagram	2	4	24		30		4,020				0
4.2		Sludge Handling Block Diagram	2	4	8		14		2,100				0
4.3		Process Area Overview Block Diagram (Pretreatment, Chemical, Sludge Handling)	4	8	24		36		5,160				0
4.4		Pretreatment	4	16	80		100		13,360				0

City of Pflugerville			**Labor Classifications**							**Non-Labor Fee**			
Water Treatment Plant Expansion			**Hours**							**Non-Labor**			
Level Of Effort Spreadsheet			$200	$185	$120	$75							1.00
			PM	**Sr**	**Sr**	**Sr**							
			Principal	**I&C**	**CAD**	**Adm**	**Total**	**Infl**	**Labor**				**Sub-**
Task Description							**Hours**	**Fact**	**Fee**	**Repro**	**Trav**	**Deliver**	**Total**
4.5		Membrane	8	24	80		112		15,640				0
4.6		Existing HSPS	2	16	40		58		8,160				0
4.7		New HSPS	2	4	40		46		5,940				0
4.8		Chemical	2	4	40		46		5,940				0
4.9		Backwash Clarifiers	2	4	40		46		5,940				0
4.10		Recycle Pump Station	2	4	40		46		5,940				0
4.11		Sludge Thickener	2	4	40		46		5,940				0
4.12		Instrumentation Installation Details	4	16	40		60		8,560				0
4.13		Misc Details	2	16	24		42		6,240				0
		Subtotal	*38*	*124*	*520*	*0*	*682*	*0*	*92,940*	*0*	*0*	*0*	*0*
5.0		**Specifications**											
5.1		General Specifications	4	16		40	60		6,760				0
5.2		Componet Specifications (PLC, Network, Instrument, etc.)	16	40		40	96		13,600				0
5.3		Risk Assessment	16	64		16	96		16,240				0
5.4		Control Description Narrative	40	120		80	240		36,200				0
5.5		I/O List	16	40		16	72		11,800				0
		Subtotal	*92*	*280*	*0*	*192*	*564*	*0*	*84,600*	*0*	*0*	*0*	*0*
6.0		**Bid Phase and Other**											
5.1		City Permit Review	2	12			14		2,620				0
5.2		Pre-bid Meeting/Site Walkthrough	8				8		1,600				0
5.3		Bidding RFI and Addenda	2	8	16		26		3,800				0
5.4		Membrane Pre-Selection Process Assistance	4	20			24		4,500				0
5.5		Conformed Set	4	12	24	4	44		6,200				0
		Subtotal	*20*	*52*	*40*	*4*	*116*	*0*	*18,720*	*0*	*0*	*0*	*0*

City of Pflugerville			**Labor Classifications**								**Non-Labor Fee**			
Water Treatment Plant Expansion			**Hours**								**Non-Labor**			
Level Of Effort Spreadsheet			$200	$185	$120	$75								1.00
			PM	**Sr**	**Sr**	**Sr**								
			Principal	**I&C**	**CAD**	**Adm**	**Total**	**Infl**	**Labor**					**Sub-**
Task Description							**Hours**	**Fact**	**Fee**	**Repro**	**Trav**	**Deliver**	**Total**	
		Phase 1 Total	***362***	***660***	***656***	***300***	***1,978***	***0***	***295,720***	***0***	***1,600***	***0***	***1,600***	
		Sub Total	**362**	**660**	**656**	**300**	**1,978**		**295,720**				**1,600**	
		Total	**$**	**297,320.00**										