



III.

Article 3, Contract Term shall be amended so that the contract term shall terminate at the close of business day on September 30, 2020.

IV.

Article 4, Compensation and Exhibit D, Fee Schedule shall be amended by increasing by \$7,909,514.00 the lump sum amount payable under the Contract for a total of \$10,072,107.00, as shown by the attached Addendum to Exhibit D.

**IN WITNESS WHEREOF**, the City and the Engineer have executed this Supplemental Contract in duplicate.

*[signature pages follow]*

**ALAN PLUMMER ASSOCIATES, INC.**

By: Stephen J Coonan  
Stephen J Coonan (Principal)

10/5/18  
Date

**CITY OF ROUND ROCK**

**APPROVED AS TO FORM:**

**By:** \_\_\_\_\_  
**Craig Morgan, Mayor**

\_\_\_\_\_  
**Stephan L. Sheets, City Attorney**

\_\_\_\_\_  
**Date**

## **ADDENDUM TO EXHIBIT A**

### **City Services**

#### **PARTNERS PROVIDED SERVICES**

1. PARTNERS will provide to CONSULTANT all data in PARTNERS's possession relating to CONSULTANT's services on the Project. CONSULTANT will reasonably rely upon the accuracy, timeliness, and completeness of the information provided by the PARTNERS.
2. PARTNERS will make its facilities accessible to CONSULTANT for performance of its services and will provide labor and safety equipment for such access. PARTNERS will perform, at no cost to CONSULTANT, such tests of equipment, machinery, pipelines, and other components of PARTNERS's facilities as may be required in connection with CONSULTANT's services.
3. PARTNERS will give prompt notice to CONSULTANT whenever PARTNERS observe or become aware of development that affects the scope or timing of CONSULTANT's services, or of defect in the work of CONSULTANT or the CONTRACTOR.
4. The PARTNERS shall examine information submitted by CONSULTANT and provide comments in writing and provide decisions in a timely manner.
5. The PARTNERS shall furnish required information and approvals in a timely manner.
6. The PARTNERS shall cause all agreements with the CONTRACTOR to be consistent with CONSULTANT's Agreement.

**ADDENDUM TO EXHIBIT B**  
**Engineering Services**

Attached Behind This Page

# Brushy Creek Regional Wastewater System East Plant Expansion

## Scope of Work

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*Task 3. Equipment Preselection*

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*Task 7. Quality Review*

*Task 8. Bidding Assistance*

LIST OF ASSUMPTIONS

PARTNERS PROVIDED SERVICES

## Detailed Design

### ***Introduction***

The scope of this project is to provide design services for the expansion of Brushy Creek WWTP. Design is based on the Preliminary Engineering Report, Design Basis memoranda and decisions made to date. The scope and fee in this document supersedes and replaces in its entirety the scope identified in supplemental Amendment 1 for Equipment Preselection, survey and geotechnical services. Design services include Design and Bidding services for the following treatment areas.

### ***Treatment Areas***

0 General: Provide general information about the project including site location, project and future site plan, soil boring locations, general construction notes, pipe materials and piping notes, abbreviations, instrumentation legend, process diagrams, treatment unit's summary, schematics, hydraulic profile, and P&IDs, 3D site plans and other plant-wide information.

100 Civil/Sitework and Yard Piping: Provide additional yard piping improvements as required for the new treatment facilities listed below. A new interceptor extension will be tunneled from the southeast side of the plant to the new Influent Lift Station. The existing outfall headwall structure will not be modified. No offsite piping improvements are included.

Existing site grade will not be modified except as needed to adjust for 100-year floodplain, install new treatment facilities and to install a new earthen berm on the west side of the treatment plant to act as a visual barrier for the Kalahari Conference Center to the west. This berm will include vegetation and an associated irrigation system to provide additional screening. A plant entrance monument and associated landscaping and irrigation system will be provided. No other landscaping or irrigation systems will be provided.

Paving will be provided to new treatment areas. Pavement rehabilitation for other existing roads will be provided as directed.

200 Influent Lift Station: Design a new influent lift station. The structure will be sized large enough for 60 MGD of peak flow capacity for a future expansion, but the current phase will only include 30 MGD of pumping equipment. The structure will be deep enough to tie in the McNutt Lift Station in a future project. The pump station will utilize submersible pumps. No permanent lifting mechanism will be provided for pump removal. The lift station will also include a new septage receiving station that will include the civil and electrical infrastructure for a future electronic check in system to track deliveries and a flow meter to measure flows.

300 Preliminary Treatment Unit (includes demo of existing Headworks): Design new preliminary treatment unit to treat the full peak flow of the plant. Structure will be sized for build out flow of 120 MGD but will only include equipment for the planned peak flow of 90 MGD. System will consist of:

- an influent collection box to take flow from the two existing and one new influent lift stations,
- five (5) screen channels with ¼-inch opening mechanically cleaned screens with conveyor compactors in three (3) channels, one (1) overflow channel with manual bar rack, and one (1) channel for a future mechanical screen,
- four (4) vortex grit removal basins, three (3) with equipment and one (1) for future expansion, and one diversion channel around the grit removal systems,



- three (3) recessed impeller grit pumps to pump grit slurry to three (3) grit classifiers and space for a future grit pump and grit classifier,
- effluent splitter box to send screened and dewatered wastewater to the three (3) secondary treatment trains and provisions to send flow to a future secondary treatment train 4, and
- two dumpsters with covers to collect dewatered screenings and grit

Preliminary treatment unit will not include a building. All treatment channels and equipment will be covered with the headspace scrubbed using air ducts to pull foul air out and sent to a new odor control treatment system.

400 Aeration Basin Train 1 Modifications: Demolish existing anoxic zone/splitter box. Construct new anaerobic and anoxic zones with submersible mixers, and add internal recirculation pumps to convert existing basins to A2O biological phosphorus removal process. The internal recirculation pumps will include VFDs and will be controlled based on ORP sensors. Air to the aerobic zones will be controlled based on either dissolved oxygen or ammonia sensors, and air flow will be controlled using a modulating valve. Odor control and covers will be provided for the anaerobic zones. Existing fine bubble diffusers will be replaced.

420 Aeration Basin Train 2 Modifications: Demolish existing anoxic zone/splitter box. Construct new anaerobic and anoxic zones with submersible mixers, and add internal recirculation pumps to convert existing basins to A2O biological phosphorus removal process. The internal recirculation pumps will include VFDs and will be controlled based on ORP sensors. Air to the aerobic zones will be controlled based on either dissolved oxygen or ammonia sensors, and air flow will be controlled using a modulating valve. Odor control and covers will be provided for the anaerobic zones. Existing fine bubble diffusers will be replaced.

440 Aeration Basin Train 3: Design new aeration basins using the A2O biological phosphorus removal process for 10 MGD of design flow treatment capacity. System will consist of four (4) aeration basins, each with an anaerobic, anoxic, and aerobic zone. Basins will have submersible mixers in the anaerobic and anoxic zones, fine bubble diffusers in the aerobic zones, and internal recirculation pumps from the aerobic back to the anoxic zone. The internal recirculation pumps will include VFDs and will be controlled based on ORP sensors. Air to the aerobic zones will be controlled based on either dissolved oxygen or ammonia sensors, and air flow will be controlled using a modulating valve. Odor control and covers will be provided for the anaerobic zones.

500 Blower Building: Design a new blower building to house new blowers. Building will be sized for blowers for the current expansion to 30 MGD and have space for additional blowers for a future plant expansion. New blowers will be multistage centrifugal blowers. Blowers will be connected to the existing blower air supply header. New multistage centrifugal blowers will provide base load air supply with on/off, and the existing Turblex blowers will provide air flow variability. The blower control system will be modified to incorporate both types of blowers. Air supply will be controlled based on pressure in the air header. The existing blower control panel will either be significantly modified or replaced altogether depending on which option is most cost effective.

550 Alum Feed System: Provide new alum feed system for phosphorus removal treatment. Alum system will be sized for full chemical phosphorus removal, but will normally be operated as a phosphorus removal polishing after the biological phosphorus removal system. Alum system will be sized for 90mgd,

maximum daily flow with expansion capable for future 120 mgd maximum daily flow. Alum feed system will include a chemical storage tank(s) in a concrete bulk containment area. Alum pumps will be included in a new building adjacent to the chemical storage tank(s). Alum feed pumps will be peristaltic hose/tube style pumps. Alum feed points will be provided at the end of each aeration basin prior to the final clarifiers for polishing, as well as a secondary feed point at the effluent side of new preliminary treatment unit.

600 Final Clarifiers (will include scum pump stations): Design two new final clarifiers for the new secondary treatment train number 3. Clarifiers will be suction header style clarifiers similar to the equipment in the existing clarifiers. A scum removal pump stations will be provided to pump scum to the sludge holding tanks.

650 RAS/WAS Pump Station: Design new RAS/WAS pump station for new secondary treatment train number 3. Pump station will be a below ground pump dry pit with RAS/WAS pumps associated with the two new clarifiers. A building will not be provided for the overall pump station. Related electrical facilities and controls will be located in an adjacent building.

700 Filters: Add one (1) new cloth media filter with 12 disks in the existing reuse filter structure and redirect flow back to the front of the UV system. Filter will be Aqua Aerobics filter to match the existing. Provide additional pump and related appurtenances to send clarified secondary effluent to the existing filter structure.

800 UV Disinfection: Design a new UV disinfection system. The new UV system will include 2 channels which will each have a peak flow capacity of 30 MGD (60 MGD total). The structure will be set up to be capable of being expanded to 120 MGD total capacity in the future. The existing vertical UV system will be used to provide the remaining peak flow capacity of 90 MGD needed in the current project UV disinfection system will include four channels utilizing horizontal UV lamps or diagonal UV lamps, with the exact equipment type being determined during an evaluated bid during equipment preselection. A canopy will be provided over the UV structure.

840 Post Aeration: Design a new post aeration system utilizing removable fine bubble diffusers and turbo blowers. A canopy will be provided over the post aeration blowers.

860 Existing Plant Water: Relocate existing plant water pumps from the existing UV disinfection system to the new UV disinfection structure. Add an additional pump to provide service water for the expanded plant facilities. New control panels will be provided for the relocated plant water pumps.

880 Effluent Parshall Flume: After the UV Disinfection, Post Aeration, and Plant Water and Reuse Pumps design a new effluent Parshall flume to measure effluent flow prior to discharge.

1100 Sludge Storage Tank 1: Rehabilitate existing sludge holding tank by replacing the existing coatings on metal surfaces and replacing the existing coarse bubble diffuser systems with a fine bubble diffuser system.

1150 Sludge Storage Tank 2: Modify the existing south bulls eye plant to convert it into a sludge holding tank. Remove the existing equipment in the tank. Divide the tank into two zones with approximately 75% of the basin dedicated to unthickened sludge storage, and the remaining volume dedicated to thickened sludge storage. The unthickened zone will be uncovered and aerated with a fine bubble diffuser system. The thickened zone will be covered, the steel and concrete surfaces will be coated with a corrosion

protection coating, the head space will be exhausted and sent to the odor control system, and the zone will be aerated and mixed. Both coarse and fine bubble diffuser systems will be evaluated based on capability to provide oxygen transfer to the sludge and mixing energy.

1200 Sludge Holding Tank Blowers: Provide new positive displacement blowers for the two sludge holding tanks. A canopy will be provided for the Blowers

1250 Sludge Pump Station: Provide a new sludge pump station to pump unthickened sludge to the sludge thickeners in the solids handling building, and pump either thickened or unthickened sludge to the belt filter presses in the biosolids building. Pumps will be progressive cavity pumps.

1300 Thickening and Solids Dewatering: Relocate the two (2) belt filter presses from the solids handling building to the biosolids building. Modify these same two belt filters presses to make washdown easier. When relocated the control panels for the belt filter presses will be replaced. Other equipment accessories such as the washwater booster pump will be relocated and reused. Will coordinate with the original belt filter press manufacturer to provide startup services for the two belt presses after relocation to be included under the general contractor's scope. Replace the sludge storage hoppers on the north side of the biosolids with a new hopper system that can load dump trucks in ten minutes or less.

1400 Odor Control: Provide new odor control system. Odor control collection system will contain and collect foul air from the new influent lift station, new preliminary treatment unit, and new anaerobic zones from all the aeration basins. Odor control treatment will consist of two (2) foul air blowers, one (1) manufactured bioscrubber, and one (1) carbon adsorber unit located on a slab.

Odor control will not be provided to any areas of the plant not listed above. Odor control design assumes that existing odor control facilities will continue to remain in service and will be operated and maintained by plant operations.

1500 Chlorine System: Remove the existing chlorine gas equipment and gas sulfur dioxide system in the Chlorine Building. Add a new bulk storage tank for 12% liquid sodium hypochlorite in a concrete containment area and peristaltic sodium hypochlorite feed pumps to provide liquid sodium hypochlorite for clarifier maintenance and for the City of Round Rock's reuse system.

1600 Electrical Buildings: Design electrical buildings to support the new treatment facilities, including architectural, HVAC, structural and electrical design. A total of three (3) new electrical buildings will be designed for the UV/Effluent Pump Area, Influent Lift Station and Blower Building Area, and RAS/WAS Pump Area.

1650 Maintenance Building: Add covered parking for four (4) service vehicles on the west side of the existing maintenance building.

1900 Standard Details: Provide standard construction details as necessary to for treatment facilities listed above.

Electrical: Upgrade the existing dual power feed with larger transformers to accommodate the increased electrical load associated with the current expansion to 30 MGD and the estimated electrical loads for a future expansion to 40 MGD.

Instrumentation: Provide instrumentation to support the new and modified treatment facilities listed above. Existing instruments in areas of the plant not being modified will not be changed.

Controls: Upgrade both the hardware and software for the control system for the entire plant. This will include replacing existing PLCs with newer equipment that is readily maintainable and replacing the existing Wonderware SCADA control software with a new system utilizing high performance graphics by either VTSCADA or Ignition.

**Tasks:**

The scope of work is further defined in eight tasks including:

- Task 1. Project Management
- Task 2. Design
- Task 3. Equipment Preselection
- Task 4. Field Surveys
- Task 5. State and Local Approvals
- Task 6. OPCC and Construction Schedule
- Task 7. Quality Review
- Task 8. Bidding Assistance

***Task 1. Project Management***

CONSULTANT shall manage the services required to complete the Project tasks from start of the design phase through the end of Bidding services. Project management consists of project administration, coordination and supervision of the project team and other internal resources, external project coordination and quality management for project milestones and deliverables to meet the project schedule and budget.

***1.1. Project Execution Plan and Kickoff Meeting***

The purpose of this task is to prepare the detailed Project Management Plan (PMP) that will be used during the execution of this PROJECT. The PMP will consist of the Project scope, schedule, and deliverables; identify team member roles, responsibilities, and lines of communication; and list the members of Project team management and Review Team with email addresses and telephone numbers.

1. Project Instructions: Define PARTNERS and CONSULTANT team organization, communication, cost control procedures, document control, health and safety considerations, change management and other PROJECT management requirements.
2. CAD Standards: Define CAD software standards, graphic standards, file naming conventions and standards, revision/iteration control and other graphic standards.
3. Quality Management Plan: CONSULTANT will use its standard continuous quality control process. The QMP will define the quality control process as customized for this PROJECT.
4. Project Health and Safety Plan: CONSULTANT will develop a health and safety plan to apply to CONSULTANT employees working on this PROJECT. It will address safety in the office and during site visits and include PARTNERS requirements.

CONSULTANT shall conduct a Project kick-off meeting with PARTNERS staff to:

- Present its project team to PARTNERS;
- Establish Project objectives, goals and expectations;
- Establish lines of communication;
- Discuss Project design and construction schedule;

- Discuss design criteria and standards, equipment preferences, information needs by CONSULTANT, etc.; and
- Discuss other items as related to the Project.

A field visit shall be arranged by PARTNERS PROJECT MANAGER before or after the kick-off meeting.

CONSULTANT shall submit a Project design schedule in .pdf for PARTNERS PROJECT MANAGER's review and approval before the kick-off meeting. Initially, the schedule shall reflect the durations agreed upon during the Project scoping/fee proposal meeting. CONSULTANT shall finalize the baseline schedule after the kick-off meeting and submit to PARTNERS PROJECT MANAGER for final review. CONSULTANT shall update the schedule monthly.

CONSULTANT shall submit the meeting agenda for PARTNERS review at least three (3) days prior to the meeting and distribute the approved agenda and sign-in sheet at the meeting. CONSULTANT shall prepare meeting notes within five (5) work days after the meeting date and provide a draft to PARTNERS PROJECT MANAGER electronically for review. After incorporating PARTNERS comments, CONSULTANT shall submit the final notes electronically to PARTNERS PROJECT MANAGER within three (3) work days. Draft becomes final if no comments are provided.

***Meetings: Project kickoff meeting/site visit***

***Deliverables: Baseline schedule, kickoff meeting materials and notes.***

***1.2. Monthly Invoicing, Monitoring, Administration and Status Reporting***

The CONSULTANT will establish internal PROJECT controls to monitor PROJECT status, budget, staffing, and schedule on an on-going basis. Budget and schedule status will be reviewed by the CONSULTANT weekly. The CONSULTANT will prepare monthly status reports within 10 working days after the close of the CONSULTANT's accounting month.

Monthly status reports and invoice will be submitted electronically to PARTNERS. CONSULTANT shall submit monthly invoices in the approved format for PARTNERS review and approval. Each invoice package shall comply with the requirements of the Contract.

The Project Progress report shall include the following elements:

- Invoice
- Project progress update (previous, current and following month)
- Financial progress
- Outstanding issues/concerns requiring discussion or resolution
- Decision log
- Project scope elements added/removed
- Project schedule

***Meetings: N/A***

***Deliverables: Progress Report in pdf format***

***1.3. Subconsultant Management***

CONSULTANT shall manage, coordinate, and be responsible for efforts of its subconsultants participating in the Project. This includes distribution and coordination of work among the subconsultants,

coordination of meetings/workshops and site visits, review and payment of monthly billing, and quality assurance and control of the work and documents submitted by the subconsultants.

The following are the subconsultants involved in the Project and their area of responsibility:

#### Subconsultant Services

##### KFA

1. 100 Site/civil and Yard Piping
2. 200 Influent lift station
3. 800 UV disinfection
4. 840 Post aeration
5. 860 Existing plant water
6. 880 Effluent Parshall flume

##### FNI

1. Architectural
2. HVAC
3. Plumbing
4. Structural
5. Electrical

Raba Kistner - Geotechnical

Inland Geodetics – Topographic Survey

TBD - Subsurface Utility Survey (as supplemental services)

***Meetings: Internal Task Kickoff meetings, Internal design coordination meetings***

***Deliverables: N/A***

#### ***1.4. Coordination with Other Projects***

Elements of the Project may be affected by the decisions made on PARTNERS projects currently under evaluation, design or construction. CONSULTANT shall participate in one design coordination meeting for each project to review design information and incorporate the appropriate design element(s) of the Project into this Project.

At this time the following projects are anticipated for coordination:

- Entrance Road Project

The Entrance Road Project is understood to require additional coordination and design adjustment.

Other PARTNERS and non-PARTNERS projects may require coordination at the site and will require supplemental services.

If and when notified by PARTNERS PROJECT MANAGER, CONSULTANT shall attend meeting(s) for coordination of work with these other ongoing PARTNERS projects. Three meetings are assumed for this coordination task. If additional meetings are requested, then supplemental services shall apply.

***Meetings: Two coordination meetings***

***Deliverables: Meeting materials and notes***

### ***1.5. Progress Meetings***

Team shall conduct progress meetings with the partner agencies and separate coordination meetings with operations staff. Two operations meeting will be held for each design phase of work prior to 100% design (i.e. 30%, 60%, 90%). These meetings are in addition to the workshops and meetings referenced in other tasks.

***Meetings: 12 progress/operations meetings***

***Deliverables: Meeting materials and notes***

### ***Task 2. Design***

Design Task includes 30%, 60%, 90% and 100% design subtasks. OPCC and Quality Review are separate tasks.

#### ***2.1. 30% Design***

30% design includes preliminary discipline design tasks. The focus of the 30% design set will be finalization of process details, treatment unit sizing, equipment sizing, and controls concepts. Minimal information will be provided for architectural, HVAC, plumbing, structural, electrical, and instrumentation designs. The purpose of this task is to use the data and guidelines developed in the Preliminary Engineering Report, and further develop the approved design concepts, develop the PROJECT design to achieve a true "design freeze" at the conclusion of 30% Design. The end products from this task will consist of 30% Discipline Design Basis of Memoranda with a set of drawings which will provide sufficient information for PARTNERS and agency review and design team coordination and review. Specific work activities and deliverables from this task are as identified below.

##### ***2.1.1. Civil and Site Development***

30% Design work will consist of the following activities.

- Coordinate with disciplines and confirm the following (1) structure size, location, and orientation; (2) layout roadways/truck access corridors and define maneuvering requirements (design vehicle); (3) size and locate parking lots for employees and visitors to the facility; (4) determine emergency vehicle access requirements. (4) locate utility and piping corridors (horizontal and vertical).
- Set initial finished floor levels for new structures. Establish initial finished grades for overall major surfaces and road profiles.
- Evaluate flood plain impacts and constraints:

1. New facilities structure elevation design will be based on UBCWCID Model 100-year floodplain elevation (which is assumed to be adopted as the new FEMA flood elevation), *plus two additional feet to provide a safety factor.*
  2. Existing facilities will only be modified if they are lower than the UBCWCID Model 100-year floodplain elevation and will remain in service or will have an operation impact on treatment units that will remain in service. Even though the Central Electrical Building and adjacent electrical transformers are just above the UBCWCID Model-100 year floodplain, the design will include providing a retaining wall or berm to two feet above the model flood elevation due to the extremely critical nature of those facilities, their susceptibility to water damage, and a long lead item for replacement in the event of an inundation.
- Locate storm water management facilities.
    1. Develop initial erosion control plan for the PROJECT. Prepare initial storm water calculations. Develop initial storm water control concepts (swales, curb, and gutter).
  - Prepare cover sheet and vicinity/location map; list of drawings; design criteria sheet; pipe materials schedule; and abbreviations and symbols.
  - Landscape Design
    1. Develop preliminary layout of landscaping on proposed berm
    2. Develop preliminary layout of monument sign and plantings
    3. Landscape Irrigation: Provide design for a reuse water irrigation system for trees and turf at the berms and plant entryway. System will be designed by an experienced TCEQ Licensed Landscape Irrigator in accordance with their regulations and the Authority Having Jurisdiction.
    4. Initial Landscape Irrigation design will include sheet set up, irrigation main locations BFP locations water supply coordination, detail sheet, irrigation station identification, controller and weather station location
  - Coordinate with topographic and 3D surveyors; define surveyors' scope of work; Field survey will be conducted for the plant site to locate new infrastructure and existing tie-in elevations for the hydraulic model and design.
  - Coordinate with geotechnical engineer on boring locations; record boring locations on sitedrawings.
  - Review concepts and draft work products with and seek approval from quality control reviewer.

### **2.1.2. Architectural**

30% Design work for architectural will consist of the following activities:

- Perform a code review of existing facilities that require retrofit/rehabilitation to identify areas where the facilities do not meet current codes. Develop a plan to bring existing facilities into code compliance where necessary.
- Establish initial room sizes. Identify the adjacencies and functional requirements of each space. Establish architectural theme for exterior of building. Select interior and exterior construction materials for each building. Select roof type, slope, and roof support system for each building.



- Assign code classification to each building.
- Coordinate with other disciplines to resolve code compliance issues specific to these disciplines (e.g., National Electrical Code and National Fire Protection Association 820 issues).
- Coordinate with other disciplines on building materials and design R-values.
- Prepare initial building layouts (including plans, sections, and elevations).
- Review concepts and draft work products with and seek approval from quality control reviewer.

### **2.1.3. HVAC**

30% Design for HVAC will consist of the following.

- Review HVAC criteria and code requirements;
- Develop calculation for initial process building/structures
- HVAC modifications required due to new equipment.
- Select type of ventilation system to be used in process buildings including hazardous material areas (inlet air tempered with both inlet and outlet fans, simple exhaust fan system).
- Select type of heating system to be used (hot water boiler, hot air furnace, space heaters). Identify fuel (gas, oil, or other fuel) for heating buildings and identify local fuel storage requirements, if any.
- Select type of air conditioning system to be used in personnel spaces (variable air volume system, zoned constant air volume system).
- Coordinate with the architectural discipline to establish design R-values for exterior walls.
- Coordinate with Process Mechanical to determine overall odor control requirements for the PROJECT. Confirm adequate air changes provided for equipment/occupied spaces and use of existing facilities.
- Review concepts and draft work products with and seek approval from quality control reviewer.

### **2.1.4. Process Mechanical**

30% Design for process mechanical will consist of the following:

- Modelling
  1. Update hydraulic profile calculation and prepare hydraulic profile for process flow and side streams. Establish maximum and minimum water surface elevations for process tanks.

2. Update odor model prior to equipment preselection to verify sizing of equipment and off-site impacts.
  3. Computer Process Model Task
    - i) Update the process model with any changes made during design.
    - ii) Prepare technical memorandum summarizing model assumptions, methods, and results including recommendations for design, process optimization, and operations costs savings.
- Select equipment type and determine size/capacity/redundancy of treatment unit processes and ancillary systems.
  - Select process mechanical piping, sizes and materials.
  - Review capacity of existing processes and equipment to remain in service. Assign capacity to existing processes.
  - Coordinate with I&C to prepare process flow diagrams and P&IDs.
  - Prepare solids balance.
  - Update process flow diagrams for liquid treatment process and solids treatment process.
  - Develop process control narratives.
  - Develop schematics for plant water system, potable water system, drain system, and odor control system.
  - Coordinate with HVAC to design new odor control facilities and evaluate available capacity of existing odor control system.
  - Develop system curves for the following pumping/blower applications prior to equipment preselection:
    1. New Influent lift station
    2. Grit Pumps
    3. Aeration Basin Internal Recirculation Pumps
    4. Return Activated Sludge Pumps
    5. Waste Activated Sludge Pumps
    6. Alum Feed Pumps
    7. Filter Relift Pump
    8. Effluent Pumps
    9. Sludge Transfer Pumps
    10. Waste Activated Sludge Transfer Pumps
    11. Aeration Basin Blowers
    12. Post-Aeration Blowers
    13. Sludge Holding Tank Blowers
    14. Foul Air Fans

- Compile list of chemicals and amounts to be used.
- Develop process mechanical criteria and code requirements;
- Develop process mechanical building/structure plans and sections.
- Update equipment list with sizing for major equipment. Coordinate with the PARTNERS on preferences of equipment manufacturer and processes.
- Prepare equipment arrangements.
- Review concepts and draft work products with and seek approval from quality control reviewer.

#### **2.1.5. Plumbing**

30% Design for Plumbing will consist of the following.

- Coordinate with local fire marshal and Architect to determine requirements for sprinklers, separation and fire protection.
- Determine locations for safety eyewash/showers
- Determine overall potable water requirements for the PROJECT. Confirm adequate quantity and pressure can be obtained from the local potable water supply utility.
- Review concepts and draft work products with and seek approval from quality control reviewer.

#### **2.1.6. Structural**

30% Design work for structural will consist of the following activities.

- Perform a structural evaluation of existing facilities that require retrofit/rehabilitation to identify areas where the facilities may need additional reinforcement or modifications.
- Develop initial structural demolition plans.
- Coordinate with architectural discipline on the selection of building concepts. Consult with lead process mechanical engineer on building/structure layouts.
- Select design concepts and materials for canopies, handrails, stairs, and gratings
- Develop building foundation and structure concepts based on schematic building layouts.
- Review concepts and draft work products with and seek approval from quality control reviewer.

#### **2.1.7. Geotechnical**

30% Design work for geotechnical will consist of the following:

- Review Geotechnical Report for site specific geotechnical subsurface conditions for each facility and structure.
- Review Geotechnical Report for specific foundation requirements.
- Using results of investigations, prepare foundation and corrosion control recommendations.
- Review concepts and draft work products with and seek approval from quality control reviewer.

#### **2.1.8. Electrical**

30% Design work for electrical will consist of the following.

- Coordinate Utility service entrance site layout for utility metering cabinets.
- Prepare overall one-line diagram and individual one-line diagrams for each switchboard and motor control center for proposed facilities.
- Determine quantity and locations of electrical distribution equipment, including motor control centers, switchboards and panelboards.
- Coordinate with lead process mechanical engineers to size equipment motors.
- Prepare load calculations.
- Size electrical rooms. Prepare a preliminary layout of the major electrical equipment located in each electrical room. Determine equipment and instruments requiring uninterruptable power supplies (UPS) and locations of UPS equipment. Coordinate with I&C discipline to determine space requirements and locations for control equipment. Locate major I/O termination panels, TJB's, and control panels.
- Determine redundancy requirements for critical process mechanical equipment and power distribution per client preferences and TCEQ requirements.
- Establish preferred voltages for power distribution and utilization equipment.
- Prepare electrical site plan
- Coordinate with other disciplines (architectural, process/mechanical) to resolve code compliance issues specific to these disciplines.
- Develop schedule of hazardous and corrosive locations.
- Review concepts and draft work products with and seek approval from quality control reviewer.

#### **2.1.9. Instrumentation and Control**

30% Design work for the instrumentation and control will consist of the following activities.

- Document and develop the existing controls system architecture, include fiber optic routing, network configuration, the location of PLCs, computers, etc.
- Document existing control system panel layout, including input/output terminal locations, panel door mounted control stations and internally mounted field instruments.
- Document and develop existing PLC I/O listing
- Document existing Round Rock Lift Stations for inclusion into a communication system to the plant.
- Determine and generally locate future control system panels.
- Determine and generally develop a control system architecture that includes the existing and proposed control system panels, including routing of a fiber-optic network.
- Determine, based upon the preliminary engineering report those existing control system panels that will either be removed or modified during the expansion project.
- Document and develop Process & Instrumentation Diagrams (P&IDs) of the existing processes that will remain in service. For those modified processes the P&IDs will reflect the modifications, including new instrumentation and equipment.

#### **2.1.10. Construction Sequencing**

- Develop construction sequencing option for the project.
  - Equipment relocation/modification areas
    - Replace/modify sludge hopper in biosolids building. May require temporary shut down of dewatering equipment in biosolids building.
    - Relocate belt filter presses from solids building to biosolids building. Presses will be moved one at a time.
    - Relocation of plant water pumps
  - During modifications of existing aeration basins one basin will be kept online at a time. Modifications to existing aeration basins will not commence

#### **2.1.11. 30% Design Document Completion**

- Prepare 30% Discipline Design Basis Memoranda (including drawings).
- Complete 30% OPCC – See Task 6.
- Complete 30% quality review – See Task 7.

#### **2.1.12. 30% Design Workshop**

CONSULTANT will conduct a half-day workshop with the PARTNERS's personnel to review the work products from subtasks 1.1.1 through 1.1.11, as defined above. The workshop will be held at the Plant. Final notes from the workshop and the work products as defined above will be assembled in the 30% Design report and submitted to the PARTNERS.

#### **Meetings: 30% Design Review Workshop**

**Deliverables: Meeting materials and notes and 30% Discipline Design Basis Memoranda including Drawings (electronic), Process Modelling Technical Memorandum**

#### **2.2. 60% Design**

The purpose of this task is to use the data and guidelines developed in the 30% Design Report and Drawings, and further develop the approved design concepts, develop the PROJECT design to achieve a true "design freeze" at the conclusion of 60% Design. The focus of the 60% design information will be major architectural concepts, structural development, major electrical arrangements, major HVAC and

plumbing concepts, and additional refinement of the civil and Process Mechanical designs. The designs of individual treatment units will be tailored around the equipment selected in the equipment preselection process. The end products from this task will consist of 60% drawings which will provide sufficient information for PARTNERS and agency review and design team coordination and review. Specific work activities and deliverables from this task are as identified below.

### **2.2.1. Civil and Site Development**

- Structures, vaults, road, and major site element horizontal locations are finalized. Structure floor/control levels and finished grades are finalized.
- Define demolition requirements and limits. Define CONTRACTOR staging, storage, access, and off-site access corridors.
- Prepare site grading drawings.
- Download survey data to create site-drawing files for final design.
- Set final building and structure elevations.
- Modify existing facilities at the direction of the Partners which were identified in 30% phase and are subject to inundation at the new 100-year flood elevation.
- Develop yard piping and plant drain layouts. Identify corridors for smaller piping and other utilities. Coordinate with electrical duct bank layout and odor piping layout.
- Show storm water control concepts (swales, curb, and gutter) on the Design drawings.
- Show floodplain boundaries and coordination.
- Incorporate corrosion control recommendations into design.
- Coordinate with architectural discipline on the type and location of landscape improvements and remediation.
- Landscape Design
  1. Develop planting plans for berm and entry monument
  2. Develop entry monument plans and details
  3. Landscape Irrigation design will include drip, tree ring and sprinkler head layout.
- Finalize traffic flow for chemical delivery and solids removal, parking, and lay out road access to buildings and structures. Coordinate handicap requirements with architectural discipline and local site plan regulations.
- Prepare first draft of technical specifications not already included in the pre-selection process.
- Review 60% Design and draft work products with and seek approval from quality control reviewer.

### **2.2.2. Architectural**

- Develop 3-D electronic models, building floor plans and elevations for buildings.
- Coordinate with I&C and electrical disciplines to size and locate electrical and control rooms.
- Coordinate with the Process Mechanical discipline to select the type of HVAC equipment, locate HVAC equipment rooms, determine space requirements and routing for ductwork if required, and establish design R-values for exterior walls, ceilings and roofs.
- Coordinate with structural engineer to define the structural design concepts for the facilities.
- Establish applicable codes for buildings/structures with local code officials and fire marshal. Complete building and fire code analysis.
- Develop layouts for landscape design around berm
- Develop layouts for entrance signs.
- Prepare first draft of technical specifications not already included in the pre-selection process.
- Review Design and draft work products with and seek approval from quality control reviewer.

### **2.2.3. HVAC**

- Prepare sizing calculations for HVAC equipment based on energy code requirements and selected building construction materials. Prepare HVAC equipment data sheets and cut sheets.
- Create ventilation concept drawing (louver locations, fan locations, type of equipment, air flows).
- Identify routing or right-of-way for major duct runs. Locate major air handling equipment. Confirm size of mechanical equipment rooms.
- Prepare HVAC system block diagrams. Define HVAC system control philosophy.
- Prepare first draft of technical specifications not already included in the pre-selection process.
- Review Design and draft work products with and seek approval from quality control reviewer.

### **2.2.4. Process Mechanical**

- Finalize major equipment sizing calculations.
- Finalize the hydraulic profile for major gravity process pipelines and hydraulic structures. Finalize maximum and minimum water surface elevations for process tanks.
- Coordinate with I&C on completion of P&IDs.
- Coordinate with I&C on development of process control narratives.

- Prepare 3-D electronic models, building and structure layouts (plans and major section(s)).
- Prepare preliminary mechanical equipment demolition plans.
- Assemble catalog cuts for major process equipment. Complete equipment data sheets or equipment list on major equipment items.
- Incorporate corrosion control recommendations into design.
- Coordinate with I&C in the finalization of P&IDs
- Final ancillary equipment sizing and line sizing calculations.
- Final equipment selection (type, size, weight, arrangement).
- Select piping materials.
- Prepare first draft of technical specifications not already included in the pre-selection process.
- Review 60% Design and draft work products with and seek approval from quality control reviewer.

#### **2.2.5. Plumbing**

- Coordinate with civil engineer for potable water, eyewash/showers, and fire water supply and distribution, as well as plant drain system.
- Prepare layouts and schedules for plumbing systems design
- Prepare first draft of technical specifications not already included in the pre-selection process.
- Review 60% Design and draft work products with and seek approval from quality control reviewer.

#### **2.2.6. Structural**

- Coordinate with geotechnical engineer to establish foundation design criteria for proposed facilities. Review geotechnical report and discuss foundation design approach with geotechnical engineer and senior structural reviewer.
- Document structural design concept for each building (room by room) and structure. Finalize materials of construction (cast-in-place versus precast concrete, roof structures, etc).
- Preliminary framing plan for buildings and other structures.
- Incorporate corrosion control recommendations into design.
- Prepare 3-D electronic models, preliminary floor plan for major structures.
- Prepare first draft of technical specifications not already included in the pre-selection process.



- Review 60% Design and draft work products with and seek approval from quality control reviewer.

### **2.2.7. Electrical**

- Prepare detailed electrical load calculations.
- Identify rights-of-way and routing methods for electrical conduit and cable tray. Lay out duct bank system (major runs/manholes). Locate manholes and hand holes. Coordinate with civil yard piping
- Prepare preliminary site lighting layout.
- Prepare electrical site plan
- Prepare site demolition, circuit & equipment relocation plan
- Prepare electrical utility coordination
- Prepare ductbank details
- Prepare power systems study
- Prepare short circuit analysis
- Analyze motor starting and voltage/frequency response
- Prepare main Switchgear One-line Diagrams
- Develop main switchgear design
- Design a preliminary interior lighting layout.
- Define hazardous locations (NFPA 820) and document. Define corrosive locations and document.
- Prepare first draft of technical specifications not already included in the pre-selection process.
- Review 60% Design and draft work products with and seek approval from quality control reviewer.

### **2.2.8. Instrumentation and Control**

- Finalize the of control system architecture that includes the existing and proposed control system panels, including routing of a fiber-optic network.
- Finalize the modifications the existing control system panels, including the removal of panel door-mounted control stations and internally, mounted field instruments
- Finalize the PLC input/output list for existing control system panels.

- Develop PLC input/output list for proposed control system panels.
- Develop P&IDs for proposed processes, including instruments, equipment, panel fronts and input/outputs into PLC.
- Develop a CCTV system architecture.
- Develop plans for modifying existing control room and network equipment.
- Develop documents for communication to offsite lift stations.
- Develop modifications to existing starters and VFDs caused by the removal of the control system panel door mounted devices.
- Develop I&C specifications
- Develop and discuss selection/procurement of system integrator.

#### **2.2.9. 60% Design Document Completion**

- Draft project specific Division 0 and 1 documents including draft bid forms, bidder requirements, temporary field office, temporary utilities, testing, site security requirements.
- Prepare 60% Design drawings (using the same disciplines as shown in Task 1.2).
- Prepare draft technical specifications.
- Prepare revised calculations.
- Complete 60% OPCC – See Task 6.
- Complete 60% quality review – See Task 7.

#### **2.2.10. 60% Design Workshop**

CONSULTANT will conduct a 1/2-day workshop with the PARTNERS's personnel to review the work products from subtasks 1.2.1 through 1.2.10 defined above. The workshop will be held at the Plant. Final notes from the workshop and the work products as defined above will be assembled in the 60% Design report and submitted to the PARTNERS.

#### **Meetings: 60% Design Review Workshop**

**Deliverables: Meeting materials and notes, and 60% Design Drawings and Specifications (electronic)**

#### **2.3. 90% Design**

The purpose of this task is to utilize the conceptual decisions of the PROJECT that were made during 60% and to complete and finalize the Design preliminary calculations and progress design to approximately 90% completion. Structures, equipment, major plant piping, process, site plan are finalized to allow final detailing during 90% Design. Specific activities, and work products from this phase are described in the following subtasks:

### **2.3.1. Civil and Site Development**

- Finalize site drawings
- Finalize road and piping plans, profiles and details
- Finalize landscape and irrigation plans
- Prepare miscellaneous civil drawings, details and standard details
- Finalize technical specifications

### **2.3.2. Architectural**

- Finalize models, plans and sections
- Finalize elevations
- Prepare details and standard details
- Finalize technical specifications

### **2.3.3. HVAC**

- Finalize models, plans and sections
- Prepare details and standard details
- Prepare final HVAC equipment list
- Finalize technical specifications

### **2.3.4. Process Mechanical**

- Finalize calculations
- Update hydraulic calculations to design confirm early design assumptions.
- Finalize plans and sections
- Prepare details and standard details
- Prepare final equipment schedules
- Finalize technical specifications

#### **2.3.5. Plumbing**

- Finalize models, plans, sections and riser diagrams
- Prepare details and standard details
- Prepare final plumbing equipment list
- Prepare final plumbing schedules
- Finalize technical specifications

#### **2.3.6. Structural**

- Finalize models, plans and sections
- Prepare details and standard details
- Finalize calculations
- Finalize technical specifications

#### **2.3.7. Electrical**

- Finalize project electrical drawings
- Finalize area electrical drawings
- Develop miscellaneous electrical drawings, details and standard details
- Prepare final electrical schedules
- Finalize technical specifications

#### **2.3.8. Instrumentation and Control**

- Develop data sheets for field mount instrumentations
- Develop interconnection termination diagram drawings
- Develop conduit and wiring drawings
- Develop control strategies for HMI/PLC configuration

#### **2.3.9. Construction Sequencing**

- Revise and finalize construction sequencing for modified and relocated facilities.
- Develop process recommendations for the Contractor's use.

#### **2.3.10. 90% Design Document Completion**

- Finalize specification front-end documents, including General Conditions, General Requirements, bidding documents, bonds, and Instruction to Bidders. PARTNERS input is required at this point to determine construction contract requirements and insurance requirements.
- Prepare 90% Design drawings (using the same disciplines as shown in Task 2.2).
- Prepare draft technical specifications.
- Prepare final calculations.
- Complete 90% OPCC – See Task 6.
- Complete 90% quality review – See Task 7.

#### **2.3.11. 90% Design Workshop**

CONSULTANT will conduct half-day design workshop to review the work products with the PARTNERS's staff. The workshop will be held at the Plant.

Final workshop notes, documenting key decisions and the work products produced through subtasks above will be submitted to the PARTNERS.

**Meetings: 90% Design Review Workshop**

**Deliverables: Meeting materials and notes and 90% Design Drawings and Specifications (electronic) , Final Design Basis Memoranda (electronic)**

#### **2.4. 100% Design**

The purpose of this task is to develop the final contract drawings, specifications, and schedules for competitive bidding as well as the Final Design Report summarizing the design criteria and assumptions. Key activities will consist of:

##### **2.4.1. Final Contract Document Completion**

CONSULTANT will modify the contract documents to reflect agreed upon final review comments from the PARTNERS, applicable regulatory agencies and CONSULTANT's quality control review team. The final documents will then be submitted to the PARTNERS.

- Prepare final construction drawings (using the same disciplines as shown in Task 2.3).
- Prepare final technical specifications.

##### **2.4.2. Final Design Report Completion**

The Design Report will be finalized based on updates made during the design process. Draft and Final Design Reports will be submitted. As this is not part of the contract documents, it will be submitted after conformed documents are submitted.

**Meetings: N/A**

**Deliverables: 100% Signed and Sealed Design Drawings and Specifications (electronic)**

### ***Task 3. Equipment Preselection***

Equipment preselection task will include development of one equipment preselection package. The task will be kicked off with an Equipment Identification effort following by developing front-end documents and technical specifications and supporting drawings, as well as bidding assistance. The equipment preselection package will likely include the following equipment. This list will be finalized in Task 3.1:

- Influent pumps x 3
- Screens x 3
- Vortex Grit system x 3
- Grit pumps x 3
- Grit classifier x 3
- Fine bubble diffusers for aeration basins
- Diffusers for sludge holding tank
- Multistage centrifugal blowers x 2
- Clarifier mechanism x 2
- RAS pumps x 5 (could be reduced to 3 as we evaluate turn down capabilities)
- WAS pumps x 2
- Alum feed pumps
- Cloth filter (sole sourced to Aqua Aerobics to go into reuse basin)
- UV disinfection x 4 channels
- Post aeration blowers (turbo or other blower type as determined to be appropriate)
- Effluent pump station pumps x 5
- Bioscrubber, carbon adsorber, and fan

Equipment preselection kickoff meeting will be held with operations, maintenance, electrical and I&C staff.

#### ***3.1. Preselection Equipment Identification***

Prepare an Equipment Preselection Identification Memorandum listing equipment needed for the project as identified in the Design Basis Memoranda. Review the equipment needs for the project with the Partners to develop a list of equipment recommended for pre-selection. Meet with project partners to finalize the list of equipment.

#### ***3.2. Preselection Front Ends***

Develop front-end documents for one equipment preselection package in conjunction with the Partners for obtaining equipment bids. The front-end documents will identify the method to be used for equipment selection; low equipment cost versus best value. The benefits of each will be discussed with the partners in a meeting.

#### ***3.3. Preselection Specifications***

Develop equipment specifications for above equipment items. Develop performance requirements and information necessary for evaluating bids with Partner's input. Specifications will identify acceptable manufacturers based on project experience and needs. Blowers, Influent Lift Station pumps, Effluent

Pump Station pumps, and UV disinfection equipment will be evaluated based on experience, reliability, operation and maintenance requirements, power usage, as well as equipment and construction costs, and other non-cost factors as part of a life cycle cost evaluation. Up to three suppliers will be evaluated for each piece of equipment

### **3.4. Preselection Drawings**

Develop supporting drawings for the equipment pre-selection package. Drawings will include process and instrumentation diagrams as well as site layouts. The drawings are intended to provide suppliers with information concerning the environment in which their equipment will be placed and the role that the equipment will play in the overall treatment process.

### **3.5. Preselection Bidding Assistance**

- 3.5.1. Assist the Partners during advertisement for equipment proposals. Respond to requests for information and prepare addendum items.
- 3.5.2. Attend pre-bid meeting and proposal evaluation meeting with the Partners.
- 3.5.3. Perform proposal reviews for conformance to the specifications and contract documents.
- 3.5.4. Prepare proposal review summary memorandum and selection recommendation letters for each equipment item.

***Meetings: Preselection Workshop 1 – Task Kickoff and Package definition; Preselection Workshop 2 – Front Ends; Preselection Workshop 3 – Draft Preselection Document Review, Preselection Pre-bid meeting, Preselection Package Bid Opening.***

***Deliverables: Meeting materials and notes, Draft and Final Equipment Preselection Identification Memorandum, Draft and Final Preselection Package Documents, Proposal Review Memorandum, Selection Recommendation Letters.***

### **Task 4. Field Surveys**

Field Survey shall be conducted to further define the existing conditions. Field surveys include topographic survey, geotechnical survey and SUE survey.

#### **4.1. Topographic Survey**

Prepare a topographic survey, which will be used to complete the design of the site plan. The topographic survey will be based on an on-the-ground survey and will be produced at a one (1)-foot interval. A point cloud survey will be conducted of existing facilities that require modification. The results will be incorporated in the engineering construction plans.

Using the survey information, prepare an existing conditions site map to identify above ground features and utilities that will play a part in the design of the project.

- 4.1.1. Primary control will be established with two (2) monumented control points set along the PROJECT area.
- 4.1.2. Control points will be one-half inch iron rods set with an aluminum cap stamped with unique alpha-numeric identifier.
- 4.1.3. All surveys, control points and key project points will reference the Texas State Plane Coordinate System, South Central Zone, NAD 83/93 HARN, horizontal datum, and NAVD 88, vertical datum.
- 4.1.4. A data sheet or ASCII file will be provided for the project site and for each primary control point set, providing geographic coordinates, recovery direction and Texas State Plane, South Central Zone coordinates. A code description legend shall be provided to explain the ASCII point list.

**Meetings: Site Visits**  
**Deliverables: N/A**

**4.2. Geotechnical**

CONSULTANT shall perform field investigations/testing to determine the existing site conditions and proper methods of demolition and construction. CONSULTANT shall provide geotechnical investigation services to characterize the subsurface soils for the areas affected by the Project. The results shall be formalized in a report and sealed by a registered professional engineer.

CONSULTANT shall submit an electronic copy of the report to PARTNERS PROJECT MANAGER. The Geotechnical Data Report supplied by the Geotechnical sub-consultant will be reviewed and evaluated.

From this basis, CONSULTANT will prepare a Geotechnical Design Report for the specific focus of application of trenchless technologies. This document interprets the geotechnical data for specific application to the methods of underground trenchless pipe installations and will be provided for inclusion in the Bid Documents for the pipeline.

Geotechnical borings shall include the following:

Proposed Boring Location	Lowest Elevation of Structure Below Ground Surface (ft)	Proposed No. of Borings	Depth (ft)
60 MGD lift station	54	1	70
120 MGD PTU	at-grade	2	35
field office	at-grade	1	25
aeration basins	15	2	40
RAS pump station	at-grade	1	25
Clarifier No. 5	15	1	40
Clarifier No. 6	15	1	40
sludge pump station	at-grade	1	35
UV/post aeration basin	8	1	35
effluent pump station	10	1	35

**Meetings: Site Drilling Coordination Meeting**  
**Deliverables: Final Geotechnical Report**

**Task 5. State and Local Approvals**

State and Local Approvals activities are assumed to be minimal and limited to correspondence with TCEQ and City of Round Rock regarding design review and permission to construct.

**5.1. TCEQ**

5.1.1. Correspondence with TCEQ regarding a Letter of Summary Transmittal (217 Letter).

**5.2. City of Round Rock**

City of Round Rock project manager will take the lead on City permitting. Additional permitting support will require additional services.

**Meetings: 1 meeting with TCEQ**

**Deliverables: Meeting materials and notes, Construction Letter to TCEQ.**



**Task 6. OPCC and Construction Schedule**

The Opinions of Probable Construction Cost (OPCC) for this Scope of Work will be prepared in accordance with the cost estimate classes defined by the Association for the Advancement of Cost Engineering. Construction schedule will be estimated at the same time and include results of the Construction Sequencing task. Estimates will be developed according to the following:

- 6.1. Equipment Preselection – “Class 3” level estimate**
- 6.2. 30% Design – “Class 4” level estimate**
- 6.3. 60% Design – “Class 3” level estimate**
- 6.4. 90% Design – “Class 2” level estimate**
- 6.5. 100% Design – “Class 2” level estimate**

The OPCC developed for the 100% design will be the CONSULTANT’s final estimate of project construction cost prior to project Bid Advertisement.

**Meetings: N/A**

**Deliverables: Equipment Preselection, 30%, 60%, 90%, and 100% OPCC**

**Task 7. Quality Review**

The objective of this task is to develop and implement procedures to obtain the highest quality deliverables. The majority of the quality control review and approval will occur prior to the finalization of the work products from each design task. Each of the subtasks below is performed following development of the technical deliverables. The relevant review points are listed under each of the subtasks. A Quality Assurance Audit Log will be used to track progress of reviews.

**7.1. Technical Review**

A Quality Team will be established by the CONSULTANT consisting of three experienced engineers familiar with similar projects. An internal meeting will be held at the end of 30%, 60%, 90% Design and prior to completion of the 100% documents. The purpose of these reviews is to confirm that the design will accomplish the PROJECT objectives.

**7.2. Intradiscipline Review**

Detailed intradiscipline review will be conducted at the completion of 30%, 60%, 90% and prior to the completion of 100% Design. These reviews will be conducted for each discipline by a person not involved in preparing the plans or specifications for this PROJECT.

**7.3. Interdiscipline Review**

Interdiscipline checking will be conducted at completion of 60%, 90% and prior to the completion of 100% for agreement and coordination among the design disciplines and the specifications.

**7.4. Constructability Review**

Constructability reviews will be conducted at the completion of 30%, 60%, 90% and prior to the completion of 100% Design for facility constructability.

**7.5. Operability Review**

Operability reviews will be conducted simultaneously with the interdiscipline reviews for consistency with the PARTNERS’s operations practices.

### **7.6. OPCC Review**

The Engineer's Opinions of Probable Construction Cost will be reviewed by the Project Engineers and Project Manager to confirm that the cost estimating team understood the work and conditions associated with the portions of the PROJECT. The cost estimates will be reviewed at the end of 30%, 60%, 90% and prior to 100% Design.

### **7.7. Final Back Check**

The Construction Document proof set will be checked to confirm that internal and external comments have been appropriately addressed and incorporated.

**Meetings: Internal Quality Review meetings for 30%, 60%, 90% Design**

**Deliverables: Quality Assurance Audit Log**

### **Task 8. Bidding Assistance**

Bidding assistance including contractor prequalification, bid opening/recommendation and conformed document development will be provided.

#### **8.1. Contractor Prequalification**

- 8.1.1. Develop Prequalification requirements to include in RFQ and use as the basis for scoring criteria.
- 8.1.2. Prepare Contractor RFQ advertisement notice.
- 8.1.3. Prepare Contractor RFQ documents.
- 8.1.4. Perform evaluation of submittals and summarize scoring along with Partner's scores and meet to review Contractor Qualifications Evaluation Memorandum.

**Meetings: Contractor Prequalification Workshop 1, Contractor Prequalification Workshop 2**

**Deliverables: Draft and Final RFQ Advertisement Notice; Draft and Final Contractor Request for Qualifications, Contractor Qualifications Evaluation Memorandum**

#### **8.2. Advertisement**

- 8.2.1. The Partner's purchasing department will advertise for bids. Consultant shall provide technical information required for advertisement.
- 8.2.2. Participate in pre-bid conferences.
- 8.2.3. Provide technical response to bidder's technical questions and prepare addenda for Partners to issue. Partners shall provide responses to non-technical questions.

**Meetings: Prebid Meeting**

**Deliverables: Responses to Bidders' technical questions; Addenda**

#### **8.3. Bid Opening/Recommendation**

- 8.3.1. Assist the Partners in opening, tabulation, and analyses of the proposals received for the project and
- 8.3.2. Furnish recommendations on the award or the appropriate actions to be taken by the Partners.
- 8.3.3. Participate in proposal review and assessment meetings.

**Meetings: Proposal Review Meeting**

**Deliverables: Award Recommendation Letter**

#### **8.4. Conformed Documents Preparation**

Prepare conformed specifications and drawings for each project based upon addenda issued during advertisement.

**Meetings: N/A**

**Deliverables: Furnish Partners two (2) full-size (22" x 34") sets, ten half-size (11" x 17") sets of "conformed" plans and specifications, and one electronic copy.**

#### **Task 9. Supplemental Services**

##### **9.1 SUE**

CONSULTANT shall provide underground utility investigation services for the accuracy of the design and minimizing change orders/work directives during construction. CONSULTANT shall provide Quality Service Level A and B subsurface utility exploration (SUE) services to identify the location and depth of existing utilities.

- **Quality Level D** – Records Research / Data Collection – Information derived from existing records or oral recollections. Included in design tasks.
- **Quality Level C** – Above ground survey – Information obtained by surveying and plotting visible above-ground utility features and by using professional judgment in correlating this information to Quality Level D. Included in design tasks.
- **Quality Level B** – Utility Designation – Utility Information obtained through the application of appropriate surface geophysical methods to determine the existence and approximate horizontal position of subsurface utilities. Supplemental Services as approved.
- **Quality Level A** – Test Hole / Pot Holing – Precise horizontal and vertical location of utilities obtained by the actual exposure and subsequent measurement of subsurface utilities, usually at a specific point. Physically locating the actual utility. Supplemental Services as approved.

SUE Supplemental Services scope of work includes 20 hours of type B explorations and Ten (10) type A explorations.

**Meetings: N/A**

**Deliverables: N/A**

## LIST OF ASSUMPTIONS

The following assumptions were used when developing the scope of service and estimating the compensation to CONSULTANT. These assumptions are in addition to the scope and additional services set forth in the scope of work.

1. The next Discharge Permit issued by TCEQ is assumed to be for an interim phase of 25 mgd with 1 mg/L Phosphorous. Changes from this assumption will require reevaluation and rework.
2. City of Round Rock will process City permits and may use progress sets at the identified design levels to support permit applications. CONSULTANT is not providing any additional "permit sets" or permit applications. Consultant will meet with code officials as detailed in the scope to identify and review code requirements.
3. The design will be based on the federal, state, and local codes and standards in effect on the effective date of the authorization to proceed. Changes in these codes may necessitate a change in scope.
4. The design work on this PROJECT will last 17 months from authorization to proceed and be completed in the February 2020 Bidding period is assumed to be 3 months.
5. CONSULTANT's design delivery process will be employed. With the exception of the final review, the PROJECT team will not stop during formal reviews of submittals.
6. The design documents will be prepared for a single construction contract.
7. The listed permit supporting documentation will be prepared by CONSULTANT. The PARTNERS will pay all permit processing fees.
8. PARTNERS specifications will be used as the basis for the Division 0 specifications. CONSULTANT master specifications will be used as the basis for other technical specifications and Division 1 documents.
9. The drawings will follow CONSULTANT CAE/CAD standards. AutoCAD will be used to develop the drawings .
10. Investigation and remediation of possible hazardous waste, asbestos, lead paint or other types of contamination will be conducted by others if needed.
11. No existing buildings, equipment, treatment units, or facilities will be modified except as specifically noted above.
12. Equipment described as being relocated is assumed to be in fully functional and not requiring any modifications to operate except required rewiring and replumbing for installation in the new location.
13. Power coordination/Arc Flash Study is not included in the Scope of Work.

14. Existing clarifier rerating is not included in this scope of work.

The following assumptions are technical in nature:

*Civil/Geotechnical*

1. Legal, easement or plat surveys of the existing site will not be required.
2. Site drawings will only be prepared for those areas of the plant where new facilities are to be constructed or involving significant disturbance to existing grading.
3. The only new roadway work required is in immediate area of new and modified facilities and existing road rehabilitation.

*Structural/Architectural/Geotechnical*

1. Conventional spread foundations will be required for new facilities. Over excavation, preload, piles, or underdrain systems are not required. Uplift due to high groundwater levels, if any, will be addressed with thickened base slabs or pressure relief valves in slabs. No underdrain systems or tension systems will be required.

*Process/Mechanical*

1. Only hydraulic assessments required for design of the new or modified facilities are included.
2. The necessary process design, liquids/solids balance and energy balance calculations will be performed.
3. Design concerning "plant-wide" utility systems such as basin drainage, water, and in-plant waste collection/disposal will be limited to extensions and/or changes in existing piping. No new structures or equipment will be needed.
4. No corrosion control provisions will be required other than materials selection and coatings.
5. Air sweep hopper system will be based on a pilot design. If during piloting, it is found to require redesign, then additional services will be required.

*HVAC and Plumbing*

1. N/A

*Electrical and Instrumentation & Controls Systems*

1. The new instrumentation and control system will be based on the use of programmable logic controllers. Monitoring of the plant status will be by a commercially available PC based software package and will include plant performance trends.

2. CONSULTANT will not perform the work of developing process control system software for either the PLC or the PC interface.
3. I&C Integration will be provided by others.

List of Meetings and Deliverables			
	Task	Meetings	Deliverables
1. Project Management	1.1 PMP an Kickoff	<ul style="list-style-type: none"> <li>Project kickoff meeting/site visit</li> </ul>	<ul style="list-style-type: none"> <li>Baseline schedule</li> <li>Kickoff meeting materials and notes</li> </ul>
	1.2 Monthly Monitoring	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Progress Report in pdf format</li> </ul>
	1.3 Subconsultant Management	<ul style="list-style-type: none"> <li>Internal Task Kickoff meetings,</li> <li>Internal design coordination meetings</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
	1.4 Coordination with Other Projects	<ul style="list-style-type: none"> <li>2 coordination meetings</li> </ul>	<ul style="list-style-type: none"> <li>Meeting materials and notes</li> </ul>
	1.5 Progress Meetings	<ul style="list-style-type: none"> <li>12 progress/operations meetings</li> </ul>	<ul style="list-style-type: none"> <li>Meeting materials and notes</li> </ul>
2. Design	2.1 30% Design	<ul style="list-style-type: none"> <li>30% Design Review Workshop</li> </ul>	<ul style="list-style-type: none"> <li>Meeting materials and notes</li> <li>30% Discipline Design Basis Memoranda including Drawings (electronic)</li> <li>Process Modelling TM</li> </ul>
	2.2 60% Design	<ul style="list-style-type: none"> <li>60% Design Review Workshop</li> </ul>	<ul style="list-style-type: none"> <li>Meeting materials and notes</li> <li>60% Design Drawings and Specifications (electronic)</li> </ul>
	2.3 90% Design	<ul style="list-style-type: none"> <li>90% Design Review Workshop</li> </ul>	<ul style="list-style-type: none"> <li>Meeting materials and notes</li> <li>90% Design Drawings and Specifications (electronic)</li> <li>Final Design Basis Memoranda (electronic)</li> </ul>
	2.4 100% Design	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>100% Signed and Sealed Design Drawings and Specifications (electronic)</li> </ul>
3. Equipment Preselection	3.1 Equipment Preselection	<ul style="list-style-type: none"> <li>Preselection Workshop 1 – Task Kickoff and Package definition;</li> <li>Preselection Workshop 2 – Front Ends;</li> <li>Preselection Workshop 3 –</li> <li>Draft Preselection Document Review,</li> <li>Preselection Pre-bid meeting,</li> <li>Preselection Package Bid Opening</li> </ul>	<ul style="list-style-type: none"> <li>Meeting materials and notes</li> <li>Draft and Final Equipment Preselection Identification Memorandum</li> <li>Draft and Final Preselection Package Documents</li> <li>Proposal Review Memorandum</li> <li>Selection Recommendation Letters</li> </ul>
4. Field Surveys	4.1 Topographic Survey	<ul style="list-style-type: none"> <li>Site Visits</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
	4.2 Geotechnical	<ul style="list-style-type: none"> <li>Site Drilling Coordination Meeting</li> </ul>	<ul style="list-style-type: none"> <li>Final Geotechnical Report</li> </ul>

	Task	Meetings	Deliverables
5. State and Local Approvals	5.1 State and Local Approvals	<ul style="list-style-type: none"> <li>1 meeting with TCEQ</li> </ul>	<ul style="list-style-type: none"> <li>Meeting materials and notes,</li> <li>Construction Letter to TCEQ;</li> </ul>
6. OPCC	6.1 OPCC	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Equipment Preselection</li> <li>30% OPCC</li> <li>60% OPCC</li> <li>90% OPCC</li> <li>100% OPCC</li> </ul>
7. Quality Review	7.1 Quality Review	<ul style="list-style-type: none"> <li>Internal Quality Review meetings for 30%, 60%, 90% Design</li> </ul>	<ul style="list-style-type: none"> <li>Quality Assurance Audit Log</li> </ul>
8. Bidding Assistance	8.1 Contractor Prequalification	<ul style="list-style-type: none"> <li>Contractor Prequalification Workshop 1,</li> <li>Contractor Prequalification Workshop 2</li> </ul>	<ul style="list-style-type: none"> <li>Draft and Final RFQ Advertisement Notice</li> <li>Draft and Final Contractor Request for Qualifications</li> <li>Contractor Qualifications Evaluation Memorandum</li> </ul>
	8.2 Advertisement	<ul style="list-style-type: none"> <li>Prebid Meeting</li> </ul>	<ul style="list-style-type: none"> <li>Responses to Bidders' technical questions</li> <li>Addenda</li> </ul>
	8.3 Bid Opening/ Recommendation	<ul style="list-style-type: none"> <li>Proposal Review Meeting</li> </ul>	<ul style="list-style-type: none"> <li>Award Recommendation Letter</li> </ul>
	8.4 Conformed Documents Preparation	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Conformed Documents</li> </ul>



**ADDENDUM TO EXHIBIT D**  
**Fee Schedule**

Attached Behind This Page

**Exhibit D  
Fee Schedule\_v3**

Project Name: Brushy Creek Regional Wastewater System East Plant Expansion

Task #	Task Name	Hours	Labor Fee	Other Direct Costs	KFA <sup>1</sup>	FNI <sup>1</sup>	RK <sup>1</sup>	IG <sup>1</sup>	S.U.E. <sup>1</sup>	Subconsultants Total <sup>1</sup>	Total Fee	% of Fee
1	Project Manangement	2,479	\$ 431,280	\$ 96,116	\$ 56,430	\$ 308,018				\$ 364,448	\$ 891,844	11%
2	Design	13,331	\$ 2,155,345	\$ 57,637	\$ 851,142	\$ 2,252,357	\$ 26,011			\$ 3,129,509	\$ 5,342,491	66%
3	Equipment Preselection	2,625	\$ 436,580	\$ 11,075	\$ -	\$ 27,420				\$ 27,420	\$ 475,075	6%
4	Field Survey	1,220	\$ 141,300	\$ 4,880	\$ -	\$ 1,410		\$ 71,629		\$ 73,039	\$ 219,219	3%
5	State and Local Approvals	112	\$ 20,240	\$ 448	\$ -	\$ 945				\$ 945	\$ 21,633	0%
6	OPCC	1,500	\$ 257,500	\$ 6,000	\$ 15,780	\$ 47,335				\$ 63,115	\$ 326,615	4%
7	Quality Review	1,374	\$ 304,030	\$ 5,496	\$ 10,923	\$ 85,121				\$ 96,044	\$ 405,570	5%
8	Bidding Assistance	1,896	\$ 291,640	\$ 8,447	\$ 8,041	\$ 59,076				\$ 67,117	\$ 367,203	5%
	<b>Subtotal</b>	<b>24,537</b>	<b>\$ 4,037,915</b>	<b>\$ 190,098</b>	<b>\$ 942,315</b>	<b>\$ 2,781,681</b>	<b>\$ 26,011</b>	<b>\$ 71,629</b>	<b>\$ -</b>	<b>\$ 3,821,636</b>	<b>\$ 8,049,649</b>	<b>100%</b>
	Less Previous Supplementary Amendment 1										\$ (500,000)	
	<b>Basic Services Total</b>										\$ 7,549,649	
9	Supplemental Services								\$ 88,000	\$ 175,315	\$ 359,865	
	<b>NTE</b>		<b>\$ 25,577</b>	<b>\$ 4,218,315</b>	<b>\$ 974,512</b>	<b>\$ 2,836,799</b>	<b>\$ 26,011</b>	<b>\$ 71,629</b>	<b>\$ 88,000</b>	<b>\$ 3,986,951</b>	<b>\$ 7,909,514</b>	

<sup>1</sup> Subconsultants Total includes 1 10 markup