TETRA TECH

Tetra Tech, Inc.

WORK ORDER INITIATION FORM
for the CITY OF CLEARWATER

Date:	**December 6, 2016**
Project Number:	_____
City Project Number:	**15-0044-UT**
Plan Set Number:	**2016039**

1. PROJECT TITLE:

Water Treatment Plant 3 to RO 3 - Design and Permitting

2. SCOPE OF SERVICES:

Several groundwater wells supply raw water to the City of Clearwater's Water Treatment Plant (WTP) 3. The quality of this water is changing and the City's existing water treatment system at WTP 3 needs to be upgraded to address the changes in raw water quality. The City has requested Tetra Tech, Inc. (Tetra Tech) to provide a scope of services for the design and permitting of the improvements to WTP 3. In general, the new facilities will include pretreatment, two (2) 0.52 million gallons per day (MGD) reverse osmosis (RO) water treatment skids, chemical addition for post-treatment, an 8-inch diameter RO concentrate discharge pipeline, and associated pumps and on-site raw and finished water pipelines. The RO concentrate will be discharged into a proposed Underground Injection Control (UIC) deep injection well located at the City's Northeast Water Reclamation Facility (NEWRF). Finished water will be delivered from the WTP No. 3 site utilizing the City's existing high service pumps and finished water pipelines.

Specific details regarding the proposed facilities and services are presented below:

A. Major facilities include an advanced water treatment system composed of chemical pretreatment system, cartridge filters, two (2) 0.52 MGD reverse osmosis (RO) skids with vertical turbine feed pumps, post-treatment chemicals, an 8-inch diameter RO concentrate pipeline approximately 8,500 linear feet (LF) in length, raw and finished water yard piping, and a pre-engineered metal building housing the water treatment

process. An overhead monorail (i.e. crane) system interior to the building is not proposed herein. RO feed pump removal will be through access doors and use of portable hoists. The City is relocating the Countryside Library located directly west and adjacent to the existing WTP 3 and the new WTP will be located on the eastern side of this former library property. A proposed location of the improvements to WTP 3 is shown in the WTP No. 3 site Planning and Layout Memorandum (July 27, 2016) and will be refined during the preliminary engineering phase of this project.

B. Controls will be provided by a programmable logic controller (PLC). Alarms will provide local indication and SCADA control to the existing WTP 3 control room and citywide water system control network through fiber optic cable. A fiber optic cable will be constructed along with the concentrate force main to connect to the GWR system.

C. The RO concentrate pipeline is projected to be an 8-inch diameter pipeline and approximately 8,500 feet in length. Tetra Tech will evaluate two potential alignments for the routing of the 8-inch diameter RO concentrate pipeline. A spare parallel main will be installed with a diameter to be determined. The proposed alignments are:

1. From WTP 3, east along SR 580, north along Rigsby Lane, east along SR 580 and ending at the south end NEWRF site.

2. From WTP 3, east along SR 580 and ending at the south end NEWRF site.

The following tasks will be completed as part of the preliminary and final designs of the aforementioned facilities:

- Preliminary Design Report
- Develop the contract documents (bidding and contract documents, engineering drawings and technical specifications) for the procurement and construction of the RO water treatment system and pipelines
- Prepare and submit permit applications for the construction of these facilities

In order to provide logical, orderly completion of this assignment, the project is presented in phases. Tasks to be completed in each phase are described herein.

I. DESIGN PHASE

Task 1 – Preliminary Design

The purpose of the preliminary design phase is to gather information, develop, evaluate, and present the basis of design, and configuration of the proposed facilities. This phase will also present a budgetary cost estimate to assist the City in planning project expenditures. Tasks to be completed in this phase are described below.

A. Facilitate a project kick-off meeting with the City and Tetra Tech's staff. Prepare and distribute meeting minutes to all attendees.

B. Collect and Analyze Additional Water Quality Data: Collect and review historical water quality data on the wellfield at WTP 3, including SDI, total and particulate iron, manganese, sulfide, and total organic carbon to define pretreatment needs. Provide recommendations for further testing, if necessary, to fully characterize the raw water quality, provide all parameters for projecting RO performance and preliminarily assessing the fouling potential. It is understood that 3 of the oldest wells are not in operation, but the City has budgeted to return these wells to service and water quality data will be provided when the wells can be sampled. It is also understood the City will collect and have analyzed samples of the raw water at the plant. If the review of the raw water quality indicates that the total sulfide concentration in the water will require additional treatment or that the SDI of the raw water is not acceptable for treatment using cartridge filters only, the City may authorize the design of a media filtration treatment system to oxidize sulfur, iron and manganese for removal by the media filters.

C. Treatment process design: Establish design finished water quality, determine treatment removal requirements and develop design criteria for the treatment system. Perform RO projections to estimate the permeate quality and determine the design requirements of the RO system. Perform calculations and provide preliminary sizing and equipment selections for the pretreatment, RO system and chemical feed systems. Determine the points of tie-in to the existing system and prepare a preliminary yard piping plan. Prepare overall process schematic and preliminary P&ID drawings. Chemical feed systems are assumed to include sulfuric acid, scale inhibitor, sodium hydroxide and hydrofluosilicic acid. The system will be designed to provide 1.04 MGD of RO permeate for blending with the raw water from the wellfield. The preliminary design will examine the requirements to expand the capacity of the system to 2.0 MGD of permeate without significant additional equipment.

D. Potable Reuse Integration Planning: Evaluate potential project components and features that may be necessary to integrate the WTP 3 facilities with the City's proposed Groundwater Replenishment (GWR) System. This will include evaluation of available space at the GWR site for the construction of water storage reservoirs to serve as engineered buffer storage and preliminary sizing and routing alternatives for a purified water conveyance pipeline to connect the GWR facility to WTP 3. Conceptual site plans will be developed at both sites to highlight possible locations of future facilities for potable reuse integration. These plans are intended to serve as a planning tool to allow the City to reserve portions of land at both sites that would be needed for implementation if deemed feasible by the City at a future time. The results of these planning efforts will be summarized in a technical memorandum.

E. RO Concentrate Pipeline Planning

1. Evaluation of Pipeline Alignment Options: Determine the routing of the RO concentrate pipeline to discharge into a proposed UIC deep injection well located at the south end of the City's NEWRF property to serve WTP No. 3 and the GWR facility. The UIC well will be designed and permitted by the City's hydrogeologic consultant. Tetra Tech will be responsible for UIC wellhead design (aboveground appurtenances).

   The two proposed RO concentrate pipeline alignment options to be evaluated include:

   a. From WTP 3, east along SR 580, north along Rigsby Lane, east along SR 580 and ending at the NEWRF.

   b. From WTP 3, east along SR 580 and ending at the NEWRF.

F. Building Programming: Based on the results of the Water Treatment Plant No. 3 Water Production Evaluation Report (December 2014), the anticipated building size is expected to be approximately 2,200 S.F.

1. Building Programming Meeting: Organize one (1) building programming meeting to identify operational and functional requirements for the proposed process building.

2. Complete programming of the building and include the results in the preliminary design report.

G. Site, Electrical and Instrumentation Planning: The preliminary site plan and layout that was previously prepared by Tetra Tech for this project will be updated based upon the building programming and other preliminary design activities described above. A list of significant new electrical loads will be prepared and a single line diagram will be generated to power the new facilities and equipment. The existing electrical power system for the site will be reviewed and a preliminary plan will be developed to tie the proposed system into the existing system or provide an upgraded or new service for the proposed facilities. A preliminary instrumentation and control system architecture drawing will be prepared to show the proposed monitoring and control nodes and how the system will be tied into the existing SCADA system.

H. Preliminary Design Report

1. Incorporate the findings from the additional water quality analyses in the preliminary design.

2. Summarize the work performed under the tasks described above.

3. Prepare a preliminary opinion of cost for the construction of the improvements to WTP 3, including the advanced water treatment system, yard piping, and concentrate disposal pipeline.

4. Prepare a Preliminary Design Report (PDR) that presents the basis of design for the recommended facilities and the size and configuration of the facilities. The report will be prepared in accordance with the requirements established in Chapter 62-555 Florida Administrative Code (F.A.C.).

5. Attend a review meeting with the City, modify the report as required, and develop concurrence regarding the proposed facilities prior to final design.

Deliverables – Five (5) copies and one (1) electronic pdf file copy will be provided of the following documents:

- *Draft and Final Preliminary Design Report*

II. FINAL DESIGN PHASE

Task 1 – Final Design

Upon acceptance of the preliminary design report by the City, Tetra Tech will initiate final design of the Project. The final design will result in preparation of the bidding and contract documents, engineering drawings and technical specifications, which will be submitted to the City for review at 60-, 90- and 100-percent completion levels. The 60-percent submittal shall include engineering drawings in plan view and select sections and draft technical specifications. The 90-percent submittal shall include updated engineering drawings (all disciplines) plan views, sections, and details; bidding, contractual, and updated technical specifications; and opinion of probable construction costs. The 100-percent submittal shall include updated engineering drawings; updated bidding, contract and technical specifications and updated opinion of probable construction costs incorporating the City's comments. The project drawings will be prepared utilizing Revit 2013 to allow for the production of two dimensional drawings from a three dimensional model and bidding/specifications using MS WORD.

To ensure proper design of the facilities, Tetra Tech will obtain approval from the City for any substantial changes in the preliminary design prior to incorporation in the final design. Tasks to be completed during this phase are summarized below:

1. Surveying and Ecological Investigations
    a. Surveying: Perform topographic surveys as follows:
        i. Existing WTP 3 site and former Countryside Library property (approximately 3.0 acres total)

ii. Route survey of the RO concentrate discharge pipeline (approximately 8,500 LF).

iii. The survey work will be completed in accordance with "Minimum Technical Standards" as defined in Florida Statutes. Horizontal and vertical control will be established based on Pinellas County datum NAD83.

b. Conduct a preliminary ecological constraints review of the existing WTP 3 and former Countryside Library site and pipeline routes to determine the presence of state and/or federally listed (protected) species and their associated habitats.

c. Tree Survey: Perform a tree survey for areas affected by the development of the proposed WTP 3 facilities and pipelines.

2. Subsurface Geotechnical Investigation: Perform a soils investigation for the necessary soils data and other pertinent information required for final design of structural and stormwater management elements. Soil boring logs and classifications, existing groundwater levels and estimated seasonal high levels, pipe trench and backfill requirements, and structures foundation requirements will be submitted in report format. A program of three (3) Standard Penetration Test (SPT) borings to approximately 40 feet will be conducted at the WTP 3 site for the new advanced water treatment process building. The borings will be conducted in accordance with ASTM D-1586. The field investigation for the yard pipelines includes a program of 4 shallow SPT borings to approximately 10 feet below land surface (bls) along the proposed yard piping alignments. For the approximate 8,500 linear foot (LF) RO concentrate discharge pipeline, it is planned that 19 shallow SPT borings (to approximately 10 feet bls) will be performed along the pipeline route at approximately 500 foot intervals. Additionally, four (4) SPT borings to approximately 20 - 30 feet bls will be performed at the pipeline crossings of the following major roads: McMullen-Booth Road and SR 580. The routing of the concentrate force main will not be determined until the preliminary design phase. Depending upon the location of the force main within the right-of-way, lane closure and traffic control may be required to perform the soils investigation on SR 580. Therefore, an allowance has been included for traffic control, if required.

3. Subsurface Utility Investigation: Perform subsurface utility investigations with ground penetrating radar (GPR) and soft digs to determine locations of existing facilities at the following proposed RO concentrate pipeline crossings: McMullen-Booth Road and SR 580. Additionally, perform up to five (5) soft dig utility locates at crossings and points of tie-in connections at the WTP 3 site.

4. Prepare construction drawings necessary to clearly depict the improvements identified during preliminary design. The construction drawings shall be compiled using the City's

Deliverables Standards, as referenced in Attachment "A". A preliminary list of anticipated drawings is presented below:

General

Cover Sheet
General Notes
Index of Drawings
Legend and Abbreviations
Overall Process Flow Schematic

Civil

Existing Site Conditions, General Notes and Site Erosion
Proposed Overall Site Plan and Boring Locations
Site Geometry Plan
Site Paving, Grading and Drainage Plan
Civil Sections (1 sheet)
Civil Details (3 sheets)

Concentrate Pipeline

RO Concentrate Pipeline – Plan & Profile (18 sheets at 1" = 40' scale)
RO Concentrate Pipeline Details (3 sheets)

Landscaping and Irrigation

Landscaping Plan
Irrigation Plan
Irrigation and Landscaping Schedule and Details (2 sheets)

Structural

Process Building - General Notes and Schedules (2 sheets)
Process Building - Foundation Plan
Process Building - Slab Plan
Chemical Storage – Slab Plan
Booster Pumping – Slab Plan
Process Building – Sections (1 sheet)
Process Building – Details (3 sheets)

Architectural

General Notes and Legend
Life Safety Plan and Code Analysis
Process Building - Floor Plan
Process Building - Roof Plan
Process Building - Ceiling Plan

Process Building – Elevations
Process Building – Sections
Process Building - Miscellaneous Wall Sections
Process Building – Details
Process Building – Schedules

Plumbing

Plumbing Legend and Notes
Sanitary System Floor Plan
Domestic Water Floor Plan
Process Building – Plumbing Schedule
Process Building - Riser Diagrams (1 sheet)
Process Building – Details (2 sheets)

Process

Proposed Yard Piping Plan
Proposed Enlarged Yard Piping Plans
Yard Piping – Sections
Yard Piping – Schedule
Raw Water/Concentrate Meter Vault Plan/Sections
Booster Pump – Plan/Sections
Process Building - Overall Plan
Process Building – Piping Plan
Process Building – Cartridge Filters/Feed Pumps Plan
Process Building – Cartridge Filters/Feed Pumps Sections
Process Building – RO Skid Plan
Process Building – RO Skid Section/Perspectives
Process Building – RO Skid End Sections/Schedules
Process Building – RO CIP Plan
Process Building – RO CIP Sections
Process Building – Miscellaneous Sections
Pre Treatment Chemicals – Scale Inhibitor Feed System Plan/Sections
Pre Treatment Chemicals – Sulfuric Acid Feed System Plan/Sections
Post Treatment Chemicals – Fluoride Feed System Plan/Sections
Post Treatment Chemicals - Sodium Hydroxide Feed System Plan/Sections
Pre Treatment Chemical System Perspectives
Post treatment Chemical System Perspectives
Bulk Chemical Storage Plan
Bulk Chemical Storage Sections
Bulk Chemical Storage Isometric
Process Instrument Panel Details (2 sheets)
Process Mechanical - General Details (5 sheets)

Mechanical – HVAC

HVAC Symbols and Abbreviations
Process Building – Mechanical Plan
Process Building – RO Process Area Plan
Process Building – Controls (2 sheets)
Process Building – Details (3 sheets)
Process Building - Schedules

Electrical

Electrical Symbols and Legend
Electrical Site Plan
Electrical Site Lighting Plan
Process Building Access and Control Plan
Process Building – Power Plan
Process Building – Instrumentation Plan
Process Building –Lighting Plan
Process Building – Fire Alarm Plan
Process Building – Grounding Plan
Process Building – Lightning Protection Plan
Chemical Bulk Storage – Power Plant
Chemical Bulk Storage – Instrumentation Plan
Chemical Bulk Storage – Lighting Plan
Booster Pump – Power/Instrumentation/Lighting Plan
Metering Vault – Power/Instrumentation Plan
Electrical Duct Bank – Plan/Sections
480 V Switchgear Single Line Power Diagram
MCC Single Line Power Diagram
Telephone/Instrumentation Riser Diagrams
Electrical Room Layout/Elevations
Panel board Schedules
Lighting Schedule
Elementary Wiring Diagrams (2 Sheets)
Access Control Details
Electrical Details (5 sheets)

Instrumentation

Legend and Symbols
P&ID - Supply Water System and Conveyance (2 sheets)
P&ID - RO Treatment – Pretreatment Systems
P&ID - RO Treatment – RO Skid #1 and RO Skid #2
P&ID - RO Treatment – Typical RO Train
P&ID - RO Treatment – CIP System

P&ID - Post Treatment – Blended Permeate and Storage
P&ID - Concentrate Disposal System
P&ID - RO Pretreatment Chemical Systems (2 sheets)
P&ID - Post Treatment Chemical Systems (3 sheets)
SCADA System Architecture
Panel Details (2 sheets)
Instrument Details

5. Prepare a project manual that contains the City's bidding and contract documents (Division 0 and 1) and technical specifications (Divisions 2 through 16) for competitive bidding. The project manual and its contents will be formatted in accordance with the Construction Specification Institute (CSI) and prepared using MS WORD.

6. Prepare and submit an opinion of probable construction costs with the 90- and 100-percent submittals based on vendor quotations and previous bid tabulations.

7. Prepare for and attend up to 2 project coordination meetings with the City during final design. Prepare and distribute meeting minutes to all attendees.

8. A review meeting will be held with the City following each progress submission. Tetra Tech will prepare comment tracking sheets at each completion level, document meeting minutes, and distribute such minutes to all attendees over the project duration.

Deliverables – Five (5) copies and one (1) PDF electronic copy will be provided for each submittal described below:

- *60-, 90-, and 100-percent submittals of the bidding and contract documents, engineering drawings and technical specifications.*
- *Project coordination meetings minutes.*
- *60-, 90-, and 100-percent submittal review meeting minutes and comment/response tracking spreadsheet.*
- *Opinion of probable construction costs at the 90- and 100-percent completion levels.*

III. PERMITTING

Tetra Tech will prepare and submit permit applications and supporting documentation to the Florida Department of Environmental Protection (FDEP), Southwest Florida Water Management District (SWFWMD), the City's Planning Department, Pinellas County, and FDOT to obtain permits for construction and operation the proposed facilities. Tetra Tech will also respond to requests for additional information (RAIs) from permitting agencies to clarify the original applications. All permit application fees will be paid by the City. Permits related to this project and associated work are as follows:

1. Site Permitting (SWFWMD or FDEP) – Prepare and submit an application for a permit modification to the Environmental Resource Permit (ERP) for the WTP 3 Improvements and respond to RAIs. It is anticipated that construction within wetlands and mitigation are not necessary. Site permitting also includes the permitting of the access driveway to the new advanced water treatment facilities.

2. FDEP Permitting of WTP 3 Improvements –The WTP 3 Improvements will be permitted in accordance with the requirements established in Chapter 62-555 F.A.C. Tetra Tech will prepare and submit the FDEP applications associated with the WTP 3 Improvements. Permitting of the WTP No. 3 improvements will include a request for reduction of staffing requirements for plants with an electronic surveillance system and automatic control. Tetra Tech will prepare and submit the application associated with permitting the RO concentrate from WTP 3 for discharge into the proposed UIC deep injection well at the NEWRF. Tetra Tech will coordinate with FDEP staff to satisfy or request the removal existing WTP 3 water quality department orders related to this project.

3. City of Clearwater Level One Development Approval – Prepare for and attend one (1) pre-application meeting and prepare and submit documentation to obtain Level One Development Approval.

4. Pinellas County ROW Use – Prepare for and attend one (1) pre-application meeting for the Pinellas County Right of Way (ROW) Use permitting of the RO concentrate pipeline within McMullen-Booth Road (CR 611) ROW. Prepare and submit the ROW Use Application to the County.

5. Florida Department of Transportation (FDOT) ROW Use - Prepare for and attend one (1) pre-application meetings for the FDOT Right of Way (ROW) Use permitting of the RO concentrate pipeline within SR 580 ROW. Prepare and submit the ROW Use Application to the FDOT.

6. City of Clearwater ROW Use – Since this is a city project, preparation and submittal of a ROW Use Application is not expected.

7. City of Clearwater Building Permit Application – Prepare for and attend one (1) meeting with the City's Building Department to review the project and assist in obtaining pre-approval for Contractor pickup.

Deliverables – Five copies (5) and one (1) electronic pdf file copy to be provided of the following documents:

- *Draft and Final Permit Applications*

- *Meeting minutes of pre-application and coordination meetings*

IV. PRETREATMENT FACILITY SCOPE

The preliminary design phase for the design of the RO treatment facilities will include collecting, compiling and analyzing water quality data for the purpose of the process design of the RO system, blending facilities and chemical feed facilities. Testing will be performed to assess the level of total sulfide in the raw water, particulate iron levels and SDI of the raw water in an effort to determine if additional post treatment or pretreatment systems may be necessary or desirable. These are not included in the basic RO system design covered above. As an additional service the City may authorize the design of additional pretreatment facilities to handle sulfide and particulate removal prior to the cartridge filters. These facilities will include the oxidation of the sulfide and iron so that they can be removed by pressure media filters. Backwash water will be provided from the finished water system and backwash storage and handling facilities will be provided to concentrate the solids for disposal to the sanitary sewer system and return decant water to the head of the process. Dechlorination facilities will be provided to remove residual chlorine prior to the introduction to the membrane system.

<u>Task 1 – Preliminary Design</u>

A. Treatment process design: Establish design pretreated water quality, determine pretreatment removal requirements and develop design criteria for the pretreatment system. Perform calculations and provide preliminary sizing and equipment selections for the pretreatment and chemical feed systems. Determine the points of tie-in to the existing system and revise the preliminary yard piping plan to incorporate the pretreatment facilities. Prepare overall process schematic and preliminary P&ID drawings of the pretreatment process. Chemical feed systems are assumed to include modifications to the sodium hypochlorite feed system and sodium bisulfite. The system will be designed to treat the feed water to the RO system and the blend water flow streams.

B. Site, Electrical and Instrumentation Planning: The preliminary site plan and layout that was previously prepared by Tetra Tech for this project will be updated to include the proposed pretreatment facilities described above. A list of significant new electrical loads will be prepared and the single line diagram will be modified to power the proposed pretreatment facilities and equipment. The proposed power plan for the new RO facilities will be modified to incorporate the anticipated loads from the proposed pretreatment system. The preliminary instrumentation and control system architecture drawing will be modified to show the proposed monitoring and control nodes for the proposed pretreatment facilities.

I. Preliminary Design Report

1. Summarize the work performed under the tasks described above.

2. Update the preliminary opinion of cost for the construction of the improvements to include the pretreatment facilities.

3. Update the Preliminary Design Report (PDR) to include the basis of design for the recommended pretreatment facilities and the size and configuration of the facilities.

Task 2 – Final Design

Upon acceptance of the preliminary design of the proposed pretreatment facilities by the City, Tetra Tech will prepare the final design of those facilities and incorporate them into the overall design and bidding package for the RO treatment facilities. The final design of the pretreatment facilities will include engineering drawings and technical specifications, which will be submitted to the City for review at 60-, 90- and 100-percent completion levels.

1. Subsurface Geotechnical Investigation: Perform additional soils investigation for the necessary soils data and other pertinent information required for final design of structural elements of the pretreatment facilities.
2. Prepare construction drawings necessary to clearly depict the improvements identified during preliminary design. A preliminary list of anticipated drawings is presented below:

General
Legend and Abbreviations - Revise
Overall Process Flow Schematic - Revise

Civil
Proposed Overall Site Plan and Boring Locations - Revise
Site Geometry Plan - Revise
Site Paving, Grading and Drainage Plan - Revise

Structural
Pretreatment Equipment – Support Slabs
Backwash Holding Tank – Plan/Sections

Process
Pressure Filters - Plan
Pressure Filters – Sections
Backwash Holding Tank – Plan
Backwash Holding Tank – Sections
Backwash Facilities
Residuals Storage/Handling Facilities – Plan
Residuals Storage/Handling Facilities – Sections/Details

Electrical

Pressure Filters Power Plan
Pressure Filters Instrumentation Plan
Backwash Facilities Power Plan
Residuals Facilities Power Plan
Chemical Feed Facilities Power/Instrument Plan
Modify MCC, Duct Bank, Elementary Diagram, Lighting, Panel Schedule Sheets

Instrumentation

P&ID – Pressure Filters
P&ID – Backwash Facilities
P&ID – Residuals Facilities
P&ID – Sodium Bisulfite Feed Facilities
Control Panels

Task 3 – Permitting

Tetra Tech will modify the permit applications and supporting documentation to the Florida Department of Environmental Protection (FDEP), Southwest Florida Water Management District (SWFWMD) and the City's Planning Department to incorporate the construction of the pretreatment facilities into those construction permits.

3. EXCLUSIONS AND ASSUMPTIONS

- Total sulfide in the existing RW supply will not require RO post treatment degasification beyond the use of existing tray aeration which can only provide minimal removal. Therefore, if additional total sulfide removal is required to satisfy the regulations, prevent membrane fouling and prevent turbidity in the finished water, it may be removed by oxidation and media filtration ahead of the cartridge filters.
- Water quality testing and pilot testing are not included in this scope of services. It is assumed in the absence of performing a pilot test that standard pretreatment will be sufficient to prevent excessive fouling of the RO system or frequent change out of cartridge filter elements. However, without pilot testing no warranties are offered that these will not occur.
- Pretreatment beyond chemical addition and cartridge filtration is not included in this scope of services in the form of media filtration as additional services to be performed only after receipt of written authorization from the City.
- Preliminary and final design does not include significant modifications to existing raw water supply wells and conveyance pipelines. Tetra Tech understands that the wells that are currently out of service will be rehabilitated and returned to service under a separate contract. It has been assumed that water quality information will be provided by the City after these wells are rehabilitated. Tetra Tech will conduct a brief evaluation of the existing

raw water supply wells and conveyance pipeline, and provide recommendations to the City for any modifications and/or improvements that may be necessary to utilize for supply to a reverse osmosis membrane treatment process.

- Library site is zoned for the proposed use and no rezoning or conditional use permitting will be required.
- It is assumed that the subgrade soil conditions at the site are sufficient enough to warrant the use of shallow bearing foundations for the purposes of building and site equipment foundations.
- The concentrate force mains are assumed to be located in the area between the edge of pavement and right of way line on SR 580, pending completion of the initial routing analysis to determine existing utility conflicts and establish the routing for the final design. If the force mains must be located within the existing pavement or in the median, additional services are anticipated to be required for traffic control to perform geotechnical investigations along the route, additional coordination with FDOT and preparation of maintenance of traffic plans for field services for design and to obtain approval from FDOT. Therefore, an allowance has been provided to cover this potential outcome, pending completion of the routing analysis.

4. PROJECT GOALS:

The following work products will be delivered to the City as part of this project:

- *Draft and Final Preliminary Design Report*
- *60%, 90%, and 100% Design Plans and Specifications*
- *Draft and Final Permit Applications*

Five (5) hard copies and electronic pdf file copies of these documents will be provided to the City.

The project drawings will be produced utilizing Revit 2013 to allow for the production of three dimensional (3D) drawings. At the completion of the project, the record drawings will be submitted in AutoCAD Release 2011 format.

5. BUDGET:

See Attachment “B”

This price includes all labor and expenses anticipated to be incurred by Tetra Tech, Inc. for the completion of task 5 in accordance with Professional Services Method “A” – Cost Times Multiplier Basis and tasks 1-4 in accordance with Professional Services Method “B” – Lump Sum – Percentage of Completion by Task, **for fees not to exceed Eight Hundred Sixty Two Thousand One Hundred Dollars ($862,100)**.

The City will be responsible for paying permit application fees.

6. SCHEDULE:

The project is to be completed 11 months from issuance of notice-to-proceed. The project deliverables are to be phased as follows:

Preliminary Design	**110 calendar days**
60% construction documents	**200 calendar days**
90% construction documents and permit applications	**270 calendar days**
Final (100%) construction documents	**340 calendar days**

7. STAFF ASSIGNMENT (Consultant):

Many team members will be involved in this project. Tetra Tech's primary staff assignments for this project are as follows:

- Project Manager - Emilie Moore
- Engineer of Record - James Christopher
- Quality Assurance/ Quality Control (QA/QC) – Jarrett Kinslow
- Project Engineers – Scott Smith, Phil Walker, Erica LaBerge

The City's primary staff assignments for this project are as follows:

- Project Manager – Robert Fahey
- Deputy Project Manager – Lan-Anh Nguyen
- Project Team – David Porter, Rich Gardner, Fred Hemerick, Glenn Daniel

8. CORRESPONDENCE/REPORTING PROCEDURES:

Engineer's/Architect's project correspondence shall be directed to Emilie Moore, PE, ENV SP. City project correspondence shall be directed to Lan-Anh Nguyen, PE with copies to others as appropriate.

9. INVOICING/FUNDING PROCEDURES:

Invoices for work performed shall be submitted monthly to the City of Clearwater, Engineering Department, Attn.: Veronica Josef, Senior Staff Assistant, PO Box 4748, Clearwater, Florida 33758-4748.

City Invoicing Code: 315-96782-561300-533-000-0000_____

10. INVOICING PROCEDURES

At a minimum, in addition to the invoice amount(s) the following information shall be provided on all invoices submitted on the Work Order:

A. Purchase Order Number and Contract Amount.
B. The time period (begin and end date) covered by the invoice.

C. A short narrative summary of activities completed in the time period.
D. Contract billing method – Lump Sum or Cost Times Multiplier.
E. If Lump Sum, the percent completion, amount due, previous amount earned and total earned to date for all tasks (direct costs, if any, shall be included in lump sum amount).
F. If Cost Times Multiplier, hours, hourly rates, names of individuals being billed, amount due, previous amount earned, total earned to date for each task and other direct costs (receipts will be required for any single item with a cost of $50 or greater or cumulative monthly expenses greater than $100).
G. If the Work Order is funded by multiple funding codes, an itemization of tasks and invoice amounts by funding code.

11. SPECIAL CONSIDERATIONS:

The consultant named above is required to comply with Section 119.0701, Florida Statutes (2013) where applicable.

The proposed UIC deep injection well at the NEWRF will be designed and permitted by the City's hydrogeologic consultant. Tetra Tech will be responsible for UIC wellhead design (aboveground appurtenances). Tetra Tech under this contract will only be responsible for requesting a modification of that permit to include the concentrate force main construction and concentrate disposal from WTP No. 3.

The City is responsible for paying all application fees for permits, registrations, and certifications, including:

- Permit application fees for FDEP, SWFWMD, Pinellas County, FDOT, and City permits

PREPARED BY: **APPROVED BY:**

_____	_____
Jon Fox, PE	**Michael D. Quillen, PE**
Vice President	**City Engineer**
Tetra Tech, Inc.	**City of Clearwater**

_____ _____

Date **Date**

WORK ORDER INITIATION FORM

CITY OF CLEARWATER DELIVERABLES STANDARDS

FORMAT:

The design plans shall be compiled utilizing one of the following standards:

City of Clearwater CAD standards or Consultant’s CAD standards (please provide all supporting documents when utilizing Consultant’s Standards).

DATUM:

Horizontal and Vertical datum shall be referenced to North American Vertical Datum of 1988 (vertical) and North American Datum of 1983/90 (horizontal). The unit of measurement shall be the United States Foot. Any deviation from this datum will not be accepted unless reviewed by City of Clearwater Engineering/Geographic Technology Division.

DELIVERABLES:

A minimum of two (2) signed and sealed Plans and Contract Documents (specifications book) labeled “ISSUED FOR BID” shall be provided at the onset of the bid phase, as well as electronic copies. Electronic plan copies in PDF and CAD and electronic contract documents in PDF and MS Word.

The design plans shall be produced on bond material, 24" x 36" at a scale of 1" = 20’ unless approved otherwise. The consultant shall also deliver all digital files in CAD drawing format and PDF format together with all project data in AutoCAD Civil 3D file format. All references, such as other drawings attached, images and graphic files, custom fonts and shapes shall be included in hard copy and electronic copy.

Prior to the City Council award date, a minimum of two (2) copies of signed and sealed plans and contract documents (specifications book) labeled “CONFORMED” shall be provided. All revisions made during the bid phase shall be included in the plan sets and noted in the revision block or as a footnote. Copies of each Addendum shall be included at the front of the contract and all revisions made during the bid phase shall be incorporated into the Contract Documents.

Electronic copies of “CONFORMED” plans (PDF and CAD) and contract documents (PDF and MS Word) shall be provided prior to the City Council award date.

NOTES:

- If approved deviation from using Clearwater CAD standards, the consultant shall include all necessary information to aid in manipulating and printing/plotting the drawings. Please address any questions regarding file format to Mr. Tom Mahony, Geographic Technology Manager, at (727) 562-4762 or email address: tom.mahony@myclearwater.com.

Water Treatment Plant 3 to RO 3 - Design and Permitting

Tetra Tech, Inc.

WORK ORDER INITIATION FORM
PROJECT BUDGET

Task	Description		Consultant Services	Total
1.0	**Preliminary Design**			
1.1	Kickoff Meeting & WQ Analysis		$9,900	$9,900
1.2	Site, Process, Electrical/I&C Design & Layout		$23,800	$23,800
1.3	Pipeline Planning		$7,100	$7,100
1.4	Ecological Evaluations		$2,500	$2,500
1.5	Building Programming		$13,400	$13,400
1.6	Preliminary Design Report (30% Design)		$64,400	$64,400
				$121,100
2.0	**Final Design**			
2.1	Project Management & Progress Meetings		$21,900	$21,900
2.2	Surveying		$36,500	$36,500
2.3	Utility Locating Services		$26,400	$26,400
2.4	Geotechnical-WTP and Force Main Route		$33,100	$33,100
2.5	QA/QC, Design Coordination, Cost Estimating		$26,300	$26,300
2.6	60% Final Design Documents		$232,600	$232,600
2.7	90% Final Design Documents		$133,200	$133,200
2.8	100% Final Design Documents		$56,100	$56,100
				$566,100
3.0	**Permitting**			
3.1	Meetings, Permits Preparation & Submittal		$39,200	$39,200
				$39,200
4.0	**Preliminary and Final Design for Pretreatment Facilities**			
4.1	Preliminary Design		$49,800	$49,800
4.2	Final Design		$63,900	$63,900
				$113,700
Subtotal, Labor and Subcontractors for RO System Addition (Lump Sum)				**$840,100**
5.0	Allowance for Pipeline Alignment under State/County Road Pavement or Within Median (Cost Times Multiplier)			**$22,000**
Grand Total				**$862,100**