



January 24, 2018

Mr. Atef A. Hanna, PE
Sr. Professional Engineer
City of Clearwater
100 S. Myrtle Ave.
2nd Floor – Engineering
Clearwater, FL 33756

**Subject: Professional Engineering Services Proposal for the
Wastewater Collection System Master Plan
City of Clearwater Project Number 17-0006-UT
City Invoicing Code: 327-96218-561300-535-000-0000 \$638,973.00**

Tt # 200BP Gen/Clearwater

Dear Mr. Hanna:

Tetra Tech is pleased to furnish this proposal for professional engineering services for the above-referenced project. A detailed scope of services, compensation summary, and project implementation schedule are attached.

We look forward to serving the City of Clearwater on this project. If you should have any questions, please do not hesitate to contact me at 407-839-3955.

Very truly yours,

Tetra Tech

A handwritten signature in blue ink, appearing to read 'Andrew T. Woodcock'.

Andrew T. Woodcock, MBA, P.E.
Senior Project Manager

Attachments

ATW/ab/Collection System MP/Hanna_012418

Tetra Tech, Inc.

201 E. Pine Street, Suite 1000, Orlando, FL 32801
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Tetra Tech, Inc.

WORK ORDER INITIATION FORM for the CITY OF CLEARWATER

Date: January 24, 2018

Project Number: _____

City Project Number: 17-0006-UT

Plan Set Number: 2018001

1. PROJECT TITLE:

WASTEWATER COLLECTION SYSTEM MASTER PLAN

2. SCOPE OF SERVICES:

The City of Clearwater's wastewater collection system consists of three service areas each dedicated to one of the city's wastewater reclamation facilities (WRFs); the Northeast, East and Marshall Street WRFs. The system currently includes approximately 8,300 manholes, 370 miles of gravity sewers, 38 miles of force mains and 72 lift stations.

The Master Plan will identify capital projects to meet existing system renewal and replacement needs, and improvements to meet future growth. The goal of the Master Plan is to provide a road map for system improvements, and operations and maintenance to meet regulatory requirements as well as provide efficient reliable service to its customers. One of the crucial components of this master planning effort will be updating and calibrating the current hydraulic model to accurately reflect the behavior of the collection system during both wet weather and dry weather events. This model will be a tool to define improvements to the collection system for the Master Plan as well as a continuing resource for the city.

The Master Plan will be structured to address each WRF service area individually but will culminate in a comprehensive prioritized capital improvement program for the entire system. The proposed table of contents for the plan is:

- Executive Summary
- Section 1 Introduction
 - East WRF
 - Section 2 Existing System and Flow Characteristics
 - Section 3 Wastewater Flow Projections

- Section 4 Regulatory Requirements
- Section 5 Hydraulic Model
- Northeast WRF
 - Section 6 Existing System and Flow Characteristics
 - Section 7 Wastewater Flow Projections
 - Section 8 Regulatory Requirements
 - Section 9 Hydraulic Model
- Marshall Street WRF
 - Section 10 Existing System and Flow Characteristics
 - Section 11 Wastewater Flow Projections
 - Section 12 Regulatory Requirements
 - Section 13 Hydraulic Model
- Section 14 Capital Project Analysis and Development
- Section 15 Capital Improvement Program

In addition to the Master Plan this project includes developing the city's existing Capacity, Management, Operations and Maintenance (CMOM) Program, which will provide a summary of the city's operations practices and include an evaluation of the overall system capacity.

A. PHASE 1 - EXISTING SYSTEM AND PROJECTIONS

1. PROJECT KICKOFF MEETING

A kickoff meeting will be held within two weeks of award to introduce the team members on both the city and Tetra Tech's side, identify points of contact, and define roles and responsibilities. Prior to the meeting Tetra Tech will prepare a data request for information not already provided but necessary for the project. The status of the data request will be discussed at the kick off meeting as well as the project schedule.

2. PROJECT STATUS MEETINGS

Tetra Tech will provide progress reports to the city on a monthly basis. Tetra Tech will meet with the designated city staff monthly to update the city on the status of the project. At a minimum the Tetra Tech project manager will attend the meeting with additional Tetra Tech staff as necessary depending on the focus of the activities for the month. Tetra Tech will prepare the meeting agenda and sign in sheet for all meetings and provide a summary of the meeting minutes within one week. At a minimum the status meeting agenda will include:

- Status of work completed to date
- Key findings
- Work anticipated for the upcoming month
- Problems/obstacles identified during the reporting period
- Outstanding Issues
- Review of the project schedule

3. DATA REVIEW

Tetra Tech will review the city's hydraulic model, GIS database, Asset Management program, Customer Information System and other available documentation to identify areas where additional data is needed to develop a complete model with full connectivity and complete the Master Plan. The review will include discussions with city staff to determine the accuracy and reliability of data within the city that can be utilized to meet the requirements for the Master Plan. Possible areas requiring additional data may include:

- Flow and precipitation data
- Asset characteristics, such as age, material and depth of piping and manholes.
- Lift station pump characteristics, including downstream force main pressures
- Unidentified assets

After its review Tetra Tech will prepare a Data Review Memorandum for city review. The Memorandum will identify areas where additional data is needed to complete the Master Plan and provide alternative data or estimates to address the data gaps. For areas where additional field verification is required for the hydraulic model, Tetra Tech will provide a list of specific assets that would need to be verified and an estimate for Tetra Tech field crews to complete the task.

The city's current hydraulic model uses Infoworks CS which is no longer supported. Tetra Tech understands that the city is in the process of purchasing hydraulic modeling software that will be used for the collection system. As part of the Data Review Tetra Tech will prepare a Hydraulic Modeling Software Memorandum, summarizing available modeling software and providing a recommendation for the city's consideration, including costs.

Tetra Tech will meet with the city to discuss the Data Review memorandum and identify the course of action for either obtaining additional data, utilizing estimates or alternative data sources.

4. FIELD INVESTIGATIONS

Lift Stations

Tetra Tech will coordinate with the city to conduct field investigations to collect additional data needed to support the hydraulic model and Master Plan analysis. Tetra Tech, with city field personnel will conduct a condition assessment of each of the 72 lift stations in the city's service area. For each lift station Tetra Tech will document the assets and their condition (wetwell, pumps, control panel), conduct a draw down test, and evaluate the site elevations for potential flooding and the site's ability to accommodate standby power (including fuel driven pumps and natural gas as a fuel source) and if not already present a pump by-pass connection. Downstream force main pressure monitoring will be provided by the city. No confined space entry is included in this task. Tetra Tech will also evaluate the lift stations' SCADA system and its compatibility with other city systems.

Air Release Valves

Tetra Tech will work with the city to conduct a condition assessment of up to 50 air release valves in the system. The assessment will consist of a visual inspection of the ARV and the associated manhole housing. Tetra Tech will also witness a test of the ARVs conducted by city staff. No confined space entry is included in this task. Tetra Tech will also conduct an analysis to verify the ARVs are located at high points on the city's force main system. The analysis will use force main elevation data as contained in the city's GIS system. In areas where there is no vertical data for the force mains Tetra Tech will use ground elevations as an indicator of depth.

Tetra Tech will coordinate with the city to identify the presence of ARVs that are not contained in the GIS data but may be present at identified force main high points. ARV location and GIS data will be collected for all additional ARVs found in the system.

Asset Verification Allowance

In addition to the above evaluation Tetra Tech has budgeted an allowance of \$30,000 to conduct additional field investigation, pipe thickness tests and other evaluations as required as a result of the Data Gaps Memorandum. Tetra Tech will prepare a Health and Safety Plan for the field work and will provide the plan to the city prior to commencing the work.

5. EXISTING SYSTEM

The existing system will be summarized as a report section of the Master Plan. The section will describe the overall characteristics of each of the three service areas and the customer base and present a summary of the operations of the system. The descriptions will be separated by service area and will include an identification of areas with a high number of work orders and SSOs. A summary of all major assets will be provided including:

- Number and type of wastewater accounts
- Maps of each service area and the major sub-basins
- Gravity piping length by size, material, diameter and age
- Force main piping by size, material, diameter and age
- Force main isolation valves and air release valves
- Manhole by quantity, depth, material and age
- Lift stations with details on, ownership, pumps, wetwells (dimension and condition), control panels and other assets
- Provide a list of which stations pump to other stations and their locations

The summary will include the current asset condition determined from either the field inspections or city condition data from on-going efforts. The condition summary will also form the basis of the business risk evaluation in Phase 3. The condition of lift stations and ARVs will be summarized by unit using the city's unique asset number. The condition of manholes and gravity piping will be summarized by manhole and pipe segment and the condition of force mains will be summarized by segment.

An analysis of wastewater flows will also be presented based on historical information recorded at the WWTPs and through the city's previous flow monitoring efforts. Tetra Tech will identify the presence of high chlorides in the wastewater based on previous monitoring efforts. The summary will include estimates of base wastewater flow, infiltration and inflow.

6. FLOW PROJECTIONS

Tetra Tech will develop projections for wastewater flow through 2030 in five year increments and for 2050. Tetra Tech will meet with the city's Planning and Development Department to obtain an understanding of new growth and redevelopment trends within the service areas. The projections will also incorporate areas that currently receive wastewater service through septic tanks that are planned to connect to the wastewater system. High, low and mid-range projections will be developed to describe an envelope of potential wastewater flows. Another potential for wastewater flows would be areas currently served by county sewer with potential to connect to the city sewer system. Tetra Tech will utilize a number of sources to develop the projections including, traffic analysis zones, BEBR projections and growth information provided by the city's Planning and Development Department.

The analysis results of the demand projections will be summarized and presented as a section of the Master Plan.

7. REGULATORY REQUIREMENTS

Tetra Tech will review the regulatory status of the collection and transmission system with respect to the applicable federal, state, regional and local requirements. The review will incorporate any pending regulations and best practices that may affect the future operations of the system.

8. PHASE 1 DELIVERABLE

Tetra Tech will summarize the work efforts listed in Tasks 1 through 7 above in a deliverable to for city review. The deliverable will include a draft introductory section to the Master Pan and the following draft sections for each of the WRF's:

- Introduction
- Existing System and Flow Characteristics
- Wastewater Demand Projections
- Regulatory Review

One (1) hard copy and one electronic copy of the deliverable will be provided for city review. The deliverable will contain all tables and figures along with the report text. After a three (3) week review period, Tetra Tech will attend a review meeting at the city offices to review comments and changes to the draft report sections. Tetra Tech will prepare a comment tracking sheet, in a format agreeable to the city, that documents and addresses each comment. City comments will be incorporated into the draft report sections.

B. PHASE 2 – HYDRAULIC MODELING

1. FLOW CHARACTERIZATION

Tetra Tech will develop an understanding of the relationship between rainfall and flow rates to accurately develop the peak flow rates in the system. Data from all temporary and permanent flow meters will be evaluated to compute flow statistics, provide an understanding of where flows are generated, and characterize the flow components (dry and wet weather) for model calibration.

2. MODEL DEVELOPMENT

Utilizing the existing model, GIS system, additional data sources identified in TASK A.3, and data from the field investigation in TASK A.4, Tetra Tech will develop a model of the city's collection system. The model will include all manholes, pipe segments, force mains and pump stations there will be no simplifications of the city's conveyance system.

3. MODEL CALIBRATION

The model will be calibrated for several discrete rainfall events measured during the 2015 and 2016 flow monitoring efforts at 47 locations in the system. In addition the calibration will include up to the most recent twelve months of data from the city's eleven (11) permanent flow meters. The calibration will adjust the conveyance system and tributary area physical parameters in the model within accepted ranges to produce optimal agreement with measured data, anecdotal system observations (preferably photographic), and complaints.

The Wastewater Planning Users Group (WaPUG) has published guidelines for model calibration efforts will be utilized to verify model calibration. The model will be checked for specific rainfall events and continuous simulations using the following hydrologic and hydraulic parameters and typically acceptable criteria:

- Peak flow rate (+25/-15%)
- Event volume (+20/-10%)
- Hydrograph magnitude, shape and timing (closely resembles measured hydrograph)
- Hydraulic grade (+1.50'/-0.33').

The model will be run and adjusted to meet these criteria with respect to the measured data. A sensitivity analysis will be used to selectively adjust model parameters to optimally reproduce the system response. Regression plots will display the agreement between measured and model-projected flow rates and volumes. The plots help determine which events are considered useful for calibration/validation, and those considered to be "outliers" with respect to an accepted confidence limit. Ideal points will lie on a regression line passing through the origin with a slope of 1.0.

4. MODEL VALIDATION

In the validation process the calibrated model will be used to model system response for independent rainfall events not included in the calibration set to help validate its ability to predict system response reliably for varying rainfall conditions. Primary validation steps include:

- Select rainfall events/simulation period to be used for validation.

- Run the calibrated model for the selected rainfall events/period.
- Quantify the model validation performance using the same parameters discussed previously under calibration.
- Determine acceptance of the calibrated model, or outline further calibration efforts, to improve the model calibration.

5. EXISTING CONDITIONS

Tetra Tech will work with the city to determine the preferred level of service for which capacity assessments and alternatives will be designed. A key component of the master plan will be to establish the available capacity of the existing collection system. Tetra Tech will use the calibrated hydraulic model to predict the peak flows in the collection system and compare them to the existing sewer capacities. Tetra Tech will also provide profiles of the major sewer reaches in the system showing inverts and crown of pipe, manhole rim elevations, hydraulic grade lines, locations of hydraulically critical elements (e.g., weirs or lateral sewers), peak flows and system capacities. In addition to the profiles, plan view summary figures with sewer systems color-coded based on the available capacity (e.g., peak flow divided by the sewer capacity) will be provided. The map will indicate any locations of surface flooding and/or areas where basement backups could occur.

6. FUTURE GROWTH CONDITIONS

The calibrated hydraulic model will be used to establish the peak flow rates and capacities for three future growth conditions (year 2030, year 2030 with proposed CIP and year 2050) The model will be simulated to evaluate the system capacities at each interval identifying those portions that lack sufficient capacity, summarized in plan view and hydraulic profile graphics.

Those areas lacking sufficient capacity for the design condition will be evaluated for alternatives to identify improvements to provide the level of service required. Each area that requires improvements to meet the design condition will be studied to identify:

- Frequency and severity of capacity problems
- The nature and cause(s) of the capacity problem
- Amount of future flow into the system
- Timing of future flow into the system
- The feasible solutions.

The alternatives evaluated will fall into one of the following categories. For each problem area identified, each of the following types of improvements will be evaluated to determine the cost-effective solution to provide the necessary level of service.

- **No Action.** The No-Action alternative will be applied to those areas that are expected to **perform** adequately (to the specified level of service) with existing infrastructure for current and future growth conditions.
- **Optimize Performance of Existing Facilities.** This alternative will generally include revisions to existing pumping facilities such as adjusting operating levels or increasing nominal pumping capacities.

- **Increased Conveyance Capacity and/or Storage.** This alternative generally provides increased conveyance capacity in the system to handle the peak flows or additional storage to reduce peak flow rates. Additional conveyance capacity eliminates bottlenecks, but may impact downstream systems. If discharge rates are found to be excessive due to the increased conveyance, storage may be required to attenuate flows.
- **I/I Removal.** I/I removal alternatives seek to reduce wet weather flow rates by preventing rainfall from entering the sanitary sewer system. I/I removal alternatives will include Sanitary Sewer Elimination Survey (SSES) type activities to identify sources and recommend options to remove the inflow.

Tetra Tech will prepare preliminary alternatives that meet the agreed upon design standards and level of service, constructability, long-term maintenance, environmental impacts, aesthetics, and cost. The preliminary alternatives will be reviewed with the city prior to performing further hydraulic model simulations. Once the proposed alternatives have been developed, their effectiveness will be confirmed with the calibrated hydraulic model. Tetra Tech will prepare profiles, plan view schematics and opinions of probable cost for the recommended alternative improvements.

7. TRAINING

Tetra Tech will provide up to three days of training to city personnel on the hydraulic model and modeling software. Tetra Tech will prepare all training materials and will use the model developed by the city as the platform for training on the selected modeling program.

8. PHASE 2 DELIVERABLE

The Phase 2 deliverable will consist of a draft of Hydraulic Model section for each of the WRFs as well as a calibrated hydraulic model for the existing system, year 2030 system, year 2030 system with tentative improvements, and year 2050.

One (1) hard copy and one electronic copy of the report section will be provided for city review along with a copy of the hydraulic models developed to date. After a three (3) week review period, Tetra Tech will attend a review meeting at the city offices to review comments and changes to the draft report sections. Tetra Tech will prepare comment tracking, in a format agreeable to the city that sheet documents and addresses each comment. City comments will be incorporated into the draft report sections.

C. **PHASE 3 – CAPITAL IMPROVEMENT PROGRAM DEVELOPMENT**

1. BUSINESS RISK EXPOSURE

Tetra Tech will develop criticality tables that will define the consequences of failure for the various components of the collection system. The criticality tables will be aligned with the levels of service determined by the city for the wastewater collection system. Each criticality table will contain rating criteria that will be used to establish the criticality of each asset. Tetra Tech will assign criticality to the assets and review the ratings with the city.

Tetra Tech will also develop condition tables that will define the asset's ability to reliably fulfill its function. Each condition table will contain rating criteria and weighting factors that will be used to establish each asset's physical condition, its capacity/performance and its current reliability. These tables will be developed and reviewed with the city prior to field investigations of the lift stations. The asset condition rating shall be based upon the field investigation results, previous studies, and consolidated information provided by the city through its asset management program and other sources.

Using the criticality and condition rating a Business Risk Exposure (BRE) rating will be calculated. The BRE scores will be reviewed by the city and adjusted as needed based on city review. Risk reduction alternatives for the highest scoring assets will be identified and developed.

2. PROJECT IDENTIFICATION

Using the prioritization completed in the BRE, Tetra Tech will prepare a Capital Improvements Program (CIP) for the collection system. The CIP will consist of a listing and brief description of specific projects that will correct system deficiencies, upgrade the level of service or renew and replace aging components of the system. Among the items to be included in the project identification phase are improvements to lift stations to mitigate potential flooding and accommodate back power and the reduction of chlorides in the wastewater stream.

Projects identified for the CIP will be grouped into three scheduled segments consisting of near term (2019 to 2025), mid-term (2026 to 2030), and long term (beyond 2030) projects dependent upon the BRE score and other constraints.

Tetra Tech will develop budget level cost estimates for each project near term and mid-term segments. The estimates will include construction, permitting, engineering, and administrative costs as well as a contingency factor. The costs will be developed in 2018 dollars and then inflated as necessary to reflect the future costs in the scheduling segment that the CIP will be implemented.

3. CMOM REVIEW AND WORKSHOP

Tetra Tech will work with the city to develop a new CMOM report utilizing guidelines and checklists developed by the USEPA. In developing the CMOM report, Tetra Tech will meet with key city personnel to obtain an understanding of the management, operations and maintenance of the collection system. A general outline of the topics covered includes:

- Collection System Management
- General System Information
- Cleaning, Inspection and Assessment
- Gravity Line Maintenance
- Easements and Paving; Maintenance and Access
- Pump Station and Force Main Maintenance (including ARVs)
- Preventative Maintenance
- Reactive Maintenance

- Equipment and Tool Inventory
- Capacity Management
- Resources and Budget
- Documentation of changes and upgrades to the system
- Sewer System Maintenance Plan update

The CMOM will define the existing city policies and procedures, identify areas of improvement and refinement, and provide a framework for periodic reassessment.

Using a Strength, Weaknesses Opportunities and Threats (SWOT) format, Tetra Tech will lead a self-assessment workshop with city staff to discuss the existing policies and procedures, identify areas that require improvement and set goals for improvement. Tetra Tech will facilitate the workshop, provide the presentation materials and provide a detailed summary of the workshop and its results. Using the results of the work shop Tetra Tech will work with utility managers to further define the recommendations of the review. Tetra Tech will identify critical areas of improvement and provide a listing of short term and long term goals for the system management, operations and maintenance.

At the conclusion of the self-assessment process Tetra Tech will develop an early output memorandum describing the proposed goals for city consideration during the FY 2019 budgeting process.

4. PHASE 3 DELIVERABLE

The Phase 3 deliverable will consist of a draft of the following sections of the Master Plan:

- Capital Project Analysis and Development
- Consolidated Capital Improvement Program

In addition a draft of the Capacity Management, Operation and Maintenance (CMOM) Program report will be provided.

One (1) hard copy and one electronic copy of the deliverables will be provided for city review. After a three (3) week review period, Tetra Tech will attend a review meeting at the city offices to review comments and changes to the draft report sections and the CMOM Program report. Tetra Tech will prepare a comment tracking sheet, in a format agreeable to the city that documents and addresses each comment. City comments will be incorporated into the draft report sections.

D. PHASE 4 – REPORT PREPARATION

1. MASTER PLAN

Tetra Tech will submit one (1) hard copy and one electronic copy of the completed draft Master Plan for city review. The deliverable will include all sections of the Master Plan previously reviewed, an Executive Summary and Appendices. A copy of all previously prepared comment sheets with corrective actions noted will also be prepared and submitted.

After a three (3) week review period, Tetra Tech will attend a review meeting at the city offices to review comments and changes to the Draft Master Plan. Tetra Tech will prepare a comment tracking sheet, in a format agreeable to the city, that documents and addresses each comment. City comments will be incorporated into the Master Plan.

2. CAPACITY, MANAGEMENT, OPERATION, AND MAINTENANCE (CMOM) PROGRAM REPORT

Concurrent with the Draft Master Plan, Tetra Tech will submit one (1) hard copy and one electronic copy of the completed draft CMOM Program report for city review. The deliverable will include all sections of the CMOM report.

The review meeting will also occur concurrent with the Draft Master Plan review and Tetra Tech will prepare a comment tracking sheet, in a format agreeable to the city, separate from the tracking sheet for the Master Plan. All city comments will be incorporated into the CMOM report.

E. CONTINGENCY

A contingency budget of \$58,000 (approximately 10%) is included in this authorization for unforeseen additional service needs related to the Master Plan. This contingency will not be used without prior written authorization from the city.

3. PROJECT GOALS:

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

Task	Work Product	Method of Delivery to City
A.1	Kickoff Meeting Agenda and Meeting Summary	PDF and Word document sent via email
A.2	Project Monthly Status Reports	PDF and Word document sent via email
A.2	Project Schedule with Monthly Updates	PDF and Word document sent via email
A.2	Progress Meeting Agendas and Meeting Summaries	PDF and Word document sent via email
A.3	Data Review Memorandum	PDF and Word document sent via email
A.3	Hydraulic Modeling Software Memorandum	PDF and Word document sent via email
A.4	Health and Safety Plan	PDF and Word document sent via email
A.8	Phase 1 Deliverables – Master Plan Sections	One (1) hard copy and one (1) PDF and Word document
B.8	Phase 2 Deliverables – Master Plan Sections	One (1) hard copy and one (1) PDF and Word document
B.8	Phase 2 Deliverables - Hydraulic Models	Model files on electronic transfer media
C.3	CMOM Self-Assessment Memorandum	PDF and Word document sent via email
C.4	Phase 3 Deliverables – Master Plan Sections	One (1) hard copy and one (1) PDF and Word document
C.4	Phase 3 Deliverables – CMOM Program Report	One (1) hard copy and one (1) PDF and Word document
D.1	Draft Master Plan with Appendices	One (1) hard copy and one (1) PDF and Word document
D.1	Final Master Plan	One (1) hard copy and one (1) PDF and Word document
D.1	Hydraulic Model (existing, year 2030, year 2030 with capital improvements, 2050)	Model files on electronic transfer media
D.2	Draft CMOM Program Report	One (1) hard copy and one (1) PDF and Word document
D.2	Final CMOM Program Report	one (1) hard copy and one (1) PDF and Word document

4. **BUDGET:**

(See Attachment B)

This price includes all labor and expenses anticipated to be incurred by Tetra Tech, Inc. for the completion of these tasks in accordance with Professional Services Method “A” – Cost Times Multiplier Basis, for a **fee not to exceed six hundred thirty eight thousand nine hundred seventy three Dollars (\$638,973)**.

5. **SCHEDULE:**

The project is to be completed eighteen months from issuance of notice-to-proceed. Major project deliverables are scheduled as follows:

Data Review Memorandum	45 calendar days
Hydraulic Modeling Software Memorandum	20 calendar days
Phase 1 Deliverables	200 calendar days
Phase 2 Deliverables	310 calendar days
CMOM Self-Assessment Memorandum	210 calendar days
Phase 3 Deliverables	400 calendar days
Draft Master Plan and CMOM Report	450 calendar days
Final Master Plan and CMOM Report	480 calendar days

6. **STAFF ASSIGNMENT (Consultant):**

Tetra Tech’s primary staff assignments for this project are as follows:

- Program Manager - Emilie Moore, PE
- Project Manager – Andrew Woodcock, PE

The city’s primary staff assignments for this project are as follows:

- Engineering Manager – Jeremy Brown, PE
- Project Manager – Atef Hanna, PE
- Public Utilities Assistant Director – Richard Gardner, PE

The following list of tasks will require input by City personnel (in addition to those listed above) based on type of task performed by the consultant for the duration of the project (16 months).

TASK	DEPARTMENT	LIASION	SITE REPRESENTATIVE
Manholes and Pipes	Public Utilities	Glenn Daniel	Jerry Wells
Pump Stations	Public Utilities	Mike Gilliam/Kervin St. Aimie	Randy Foltz/Steve Berenguer
Asset Management	Public Utilities	Mike Gilliam	Kervin St. Aimie
SCADA	Public Utilities	Mike Gilliam	Kervin St. Aimie
Hydraulic Model	Engineering	Atef Hanna	Duy Nguyen
GIS	Engineering	Tom Mahony	Pawel Dembinski
Future City Growth	Planning and Development	Lauren Matzke	Kyle Brotherton
IT Issues	Information Technology	Sabrina Chute/Jeremy Williams	Pawel Dembinski

7. **CORRESPONDENCE/REPORTING PROCEDURES:**

ENGINEER's project correspondence shall be directed to:

Emilie Moore PE, and Andrew Woodcock PE

All City project correspondence shall be directed to:

Atef Hanna, PE, with copies to Jeremy Brown, PE, and Richard Gardner, PE.

ENGINEER shall provide a minimum of forty-eight (48) hours' notice prior to conducting fieldwork/site visits. ENGINEER shall provide a minimum of seven (7) days notification for site visits requiring the assistance of City Operations and Maintenance personnel.

ENGINEER acknowledges that all City directives shall be provided by the City Project Manager.

A health and safety plan must be submitted and approved by the Project Manager prior to conducting any fieldwork/site visits.

In addition to the original copies delivered as stated in the scope of work, all project deliverables will be submitted in electronic format on CD or other City approved device prior to approval of final invoice.

8. INVOICING/FUNDING PROCEDURES:

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

Contingency services will be billed as incurred only after written authorization provided by the City to proceed with those services.

City Invoicing Code: 327-96218-561300-535-000-0000 \$638,973.00

9. 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.

10. SPECIAL CONSIDERATIONS:

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

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

PREPARED BY:



Jon D. Fox, PE
Vice President
Tetra Tech, Inc.

January 24, 2018

Date

APPROVED BY:

D. Scott Rice, PE
City Engineer
City of Clearwater

Date



CITY OF CLEARWATER ENGINEERING DEPARTMENT

WORK ORDER INITIATION FORM CITY DELIVERABLES

1. **FORMAT**

The design plans shall be compiled utilizing the following methods:

1. City of Clearwater CAD standards.
2. 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.

2. **DELIVERABLES**

The design plans shall be produced on bond material, 24" x 36" at a scale of 1" = 20' unless approved otherwise. Upon completion the consultant shall deliver all drawing files in digital format with all project data in Autodesk Civil 3D file format. If not available Land Desktop files are still acceptable, however the City or Clearwater is currently phasing out Land Desktop.

NOTE: If approved deviation from Clearwater CAD standards are used the Consultant shall include all necessary information to aid in manipulating the drawings including either PCP, CTB file or pen schedule for plotting. The drawing file shall include only authorized fonts, shapes, line types or other attributes contained in the standard release of Autodesk, Inc. software. All block references and references contained within the drawing file shall be included. Please address any questions regarding format to Mr. Tom Mahony, at (727) 562 4762 or email address Tom.Mahony@myClearwater.com.

All electronic files (CAD and Specification files) must be delivered upon completion of project or with 100% plan submittal to City of Clearwater.

Wastewater Collection Master Plan Tetra Tech, Inc.

WORK ORDER INITIATION FORM PROJECT BUDGET

Task	Description	Total
1.0	Existing System and Projections	
1.A	Kick off Meeting	2,689
1.B	Status Meetings	27,520
1.C	Data Review	18,569
1.D	Field Investigation	99,939
1.E	Field Investigation Allowance	30,000
1.F	Existing System	9,362
1.G	Regulatory Review	5,101
1.H	Demand Projections	11,022
1.I	Phase 1 Deliverable	18,961
	Total	223,163
2.0	Hydraulic Modeling	
2.A	Flow Characterization	39,130
2.B	Model Development	8,254
2.C	Model Calibration	52,256
2.D	Model Validation	4,912
2.E	Existing Conditions	6,886
2.F	2030 and 2050 Model Set Up	8,349
2.G	Training	11,880
2.H	Phase 2 Deliverable	19,355
	Total	151,022
3.0	Capital Improvement Development	
3.A	Business Risk Exposure	19,057
3.B	Project Identification	62,508
3.C	CMOM Review and Workshop	37,642
3.D	Phase 3 Deliverable	43,062
	Total	162,269
4.0	Reports	35,431
5.0	Contingency	58,000
Subtotal, Labor and Subcontractors		\$629,885
Permit Review Fees		\$0
Other Direct Costs (prints, photocopies, postage, etc.) (Not applicable to lump sum Work Orders)		\$9,088
Grand Total		\$638,973