CITY OF YUBA CITY
STAFF REPORT

Date: November 20, 2018

To: Honorable Mayor & Members of the City Council

From: Public Works Department

Presentation by: Mandeep Chohan, Senior Engineer

Summary

Subject: Professional Services Agreement with West Yost Associates for the Design of the Pressure Surge Relief Facility for the Water Distribution System.

Recommendation: Award a Professional Services Agreement to West Yost Associates of Davis, CA in the amount of $329,995 plus $30,000 contingency to prepare the design documents for the Pressure Surge Relief Facility for the Water Distribution System, with the finding that it is in the best interest of the City.

Fiscal Impact: $359,995 Account No. 971246 (Pressure Surge Relief Facility)
$329,995 – Design
$30,000 – Contingency

Purpose:

To protect water distribution system integrity and conserve water by mitigating the effects of pressure surges.

Background:

The Water Treatment Plant was originally constructed in 1969. Significant improvements and expansion of the facility have taken place since original construction. The surface water treatment system has a reliable continuous design capacity of 36 million gallons per day (mgd). The water system serves approximately 19,000 service connections through 275 miles of distribution piping.

As part of the water conservation program, the City has been actively evaluating water loss throughout the 275 miles of distribution system piping. The water-loss evaluation identified that, upon loss of power at the Water Treatment Plant, the distribution system experiences sudden dramatic pressure swings. These pressure swings are much higher and lower than normal pressure in the distribution system and have been correlated to pipeline leak events. In order to best protect the distribution system piping, the power outages must be addressed through the Pressure Surge Relief Facility.

On April 4, 2017, City Council awarded a Professional Services Agreement to West Yost Associates (West Yost) to update the Water System Master Plan. West Yost was selected through a competitive Request for Proposal (RFP) process. The Water System Master Plan is anticipated to be complete by the end of December 2018. The Water System Master Plan update contract also included the water distribution system hydraulic model update, analysis for the options for the pressure surge protection, and design of the Pressure Surge Protection Facility. West Yost

has completed the hydraulic model update and presented options for the Pressure Surge Protection Facility to staff. The preferred option includes a two (2) hydropneumatic surge tank system at the Water Treatment Plant and one (1) hydropneumatic surge tank system at the Harter Water Storage Facility site.

Analysis:

The preferred option of the Pressure Surge Protection Facility required significant additional scope of work to complete the design documents for the project. Staff directed West Yost to remove the scope of work for the design of the Pressure Surge Protection Facility in the original Water System Master Plan update agreement. This resulted in $126,249 (out of the budgeted $127,506) to remain unencumbered in the Water System Capital Improvement Program budget.

Staff has negotiated a new scope of work and fees with West Yost for the design of the Pressure Surge Protection Facility in the amount of $329,995, which includes services during the bid period, such as requests for information and preparing addenda. The scope of work is included in Attachment 1.

The West Yost team is very familiar with the City's water system and has prepared related documents, including the Water System Master Plan; therefore, awarding the proposed contract to West Yost provides cost savings due to work efficiencies and time savings to complete the project.

Fiscal Impact:

The contract for design services in the amount of $329,995 and a requested contingency of $30,000 will be funded through the adopted Fiscal Year 18/19 Water System Capital Improvement Program's Pressure Surge Relief Facility project (Account No. 971246).

Alternatives:

1. Reduce the scope of work or reject the agreement and provide staff direction to delay the proposed work. If the scope of work is reduced, staff recommends that at a minimum the Pressure Surge Relief Facility at the Water Treatment Plant be advanced.
2. Direct staff to issue a Request for Proposals. Utilizing a different consulting firm could result in additional costs and time delays.

Recommendation:

Award a Professional Services Agreement to West Yost Associates of Davis, CA in the amount of $329,995 plus $30,000 contingency to prepare the design documents for the Pressure Surge Relief Facility for the Water Distribution System, with the finding that it is in the best interest of the City.

Attachments:

1. Scope of Services

Prepared by:

/s/ Mandeep Chohan
Mandeep Chohan
Senior Engineer

Submitted by:

/s/ Steven C. Kroeger
Steven C. Kroeger
City Manager

Reviewed by:

Department Head	DL
Finance	RB
City Attorney	TH via email

ATTACHMENT 1

Exhibit A. Scope of Work
Yuba City Surge Protection System Design

INTRODUCTION

Per previous communication with the City on June 4, 2018, the City would like to proceed with designing hydropneumatic tanks at the Water Treatment Plant (WTP) and adjacent to the existing Harter Storage Tanks.

TASK 1: ANALYSIS OF SYSTEM HYDRAULIC TRANSIENTS FOR BUILDOUT DEMANDS

Subtask 1-1: Hydraulic Analysis

In this task West Yost will provide hydraulic transient modeling to perform sensitivity analyses regarding the size of the hydropneumatic tanks for the preferred alternative required to mitigate and suppress hydraulic transients that occur due to system flowrate changes.

Previous transient analysis performed found that hydropneumatic surge tank sizing is very sensitive to the timing of the WTP generator and High Lift Pump Station (HLPS) sequencing, and the minimum allowable system pressure. The current preferred option involved the following assumptions:

1. Near-term maximum day demands of 34 mgd,
2. Intervals of 20 seconds for generator startup and transfer time, pump ramp up time and the delay between each pump start,
3. A 10,000-gallon hydropneumatic tank at Garden and 20,000-gallon hydropneumatic tanks at Sanborn and Harter,
4. High Lift Pump Station Pumps 10 and 11 starting simultaneously after generator startup,
5. Two 40-hp pumps are operating at Harter throughout the transient event,
6. System pressures are to be maintained at a minimum of 20 psi throughout a transient event.

With the above assumptions, the previous transient analysis showed that two 10,000-gallon tanks would be required at the WTP to mitigate the hydraulic transients. The City requested additional sensitivity analyses to refine this preferred alternative. Refinement may include adjusting which pumps start simultaneously after generator startup (Item 4) and adjusting the 20-second interval during pump startup (Item 2). These refinements will be incorporated into the sensitivity analysis listed below.

This task will include determining required sizing of the two hydropneumatic tanks at the WTP with the following three sensitivity analyses:

1. Using the original assumptions listed above, except that the hydropneumatic tanks at Sanborn and Garden are eliminated.
2. Using the original assumptions listed above, except that the hydropneumatic tanks at Sanborn and Garden are eliminated, buildout demands of 51.5 MGD are used in the

system and the distribution system infrastructure proposed for Buildout demand conditions is included.

3. One additional analysis to be determined.

Subtask 1-2: Technical Memorandum

The results of the analysis will be documented in a 5- to 10-page TM with appropriate figures illustrating potential problem areas and recommended tank sizing. The technical memorandum will be appended to the Preliminary Design Memorandum.

TASK 2: DESIGN OF PROPOSED SURGE SYSTEM

Under this task, West Yost will prepare drawings and technical specifications for the City's use in obtaining bids from general contractors. The tasks included in this proposed scope of services are based on the facility improvements listed below.

1. WTP Improvements include:
   - Two (2) 30,000-gallon hydropneumatic surge tank systems at the WTP. Tank size to be verified under Task 1. One (1) tank will be installed adjacent to the easterly 2.0 MG Clearwell and the other tank in the grassy area north of the westerly 2.0 MG Clearwell. Includes structural design for surge tank foundation and slab on grade mat foundation. Tank size and location may change based on recommendations per Task 1.
   - Two (2) pre-fabricated building to house the air compressors, one building (1) at each tank.
2. Design for installation of one (1) 20,000-gallon hydropneumatic surge tank system at the Harter Plant. Tank size to be verified under Task 1. Tank to be located adjacent to the pumping plant building.
3. Existing flow meter at WTP will be relocated above-grade. To avoid a lengthy shut-down, this improvement will likely require construction of an above-grade facility offset from the existing pipeline alignment.
4. An existing, non-functioning main line shut-off valve for the WTP (assumed to be 30-inch diameter) in Clark Avenue will be replaced by a new valve located above grade at the water treatment plant site. Work includes abandoning in place the non-functioning valve in Clark Avenue. TM will briefly address the risks with abandoning the valve in place. Replacement valve will be flanged, motor operated butterfly valve and will be installed on new above grade piping for relocated flowmeter per Item 3 above. Traffic control plans are not included.

This work will be accomplished through the following five (5) subtasks:

- Subtask 2-1: Utility Coordination and Base Map Preparation
- Subtask 2-2: Prepare Conceptual Level Site Plans of Proposed Facilities

- Subtask 2-3: Preliminary Design of Proposed Facilities
- Subtask 2-4: Final Design of Proposed Facilities
- Subtask 2-5: Task Management and Meetings

These subtasks are described below.

Subtask 2.1: Utilities Coordination and Base Map Preparation.

This task will allow for collecting and reviewing available existing utility information and data. West Yost is a Web Design Member of Underground Service Alert of Northern California (DigAlert), which allows us to contact utility owners for coordination. West Yost will prepare and submit utility request letters to all agencies registered with DigAlert located within the project area. Utility information received will be plotted on design drawings. West Yost will prepare a base map based on this utility data and existing record drawing information. Any required fees will be paid by the City.

Subtask 2-2: Prepare Conceptual Level Site Plans of Proposed Facilities

West Yost will prepare conceptual level site plans for the surge installations at Harter Plant and the WTP based on the results of Task 1.1. The site plans will be prepared prior to development of the Preliminary Design Memorandum (PDM) for City review and discussion during the kick-off meeting. The City must agree on the final design concept prior to West Yost proceeding with the design.

Additional discussions at the kick-off meeting will include overview of preliminary operations plan and mitigation of potential water quality impacts with the intent to have City agreement on approach to both items. City comments on these items and the conceptual site plans will be incorporated into the PDM.

Task 2-2 Deliverables: Draft Conceptual Site Plans in PDF format.

Subtask 2-3: Preliminary Design of Proposed Facilities

Preliminary Design Services consists of developing a Preliminary Design Memorandum (PDM) to document the proposed design at both the WTP and the Harter Plant. The PDM will include 30% level design for the proposed facility layouts; determine mechanical, structural, electrical, and control requirements; and set design standards. This task includes discussions with City regarding preliminary operations plan and potential water quality impacts.

Specific contents will include:

- Recommended facility mechanical layout
- Site improvements
- Review of current geotechnical evaluations

- Structural and electrical requirements
- Proposed SCADA monitoring requirements for the new surge tank
- Construction sequencing recommendations

West Yost will provide a draft submittal of the PDM for City review. PDM submittal to include preliminary opinions of probable construction costs. The PDM will be the basis for preparing the design drawings and specifications, and it is critical to understanding the City's site-specific needs regarding proposed improvements. Following receipt of written City comments on the draft PDM, and an in-person meeting with City staff to discuss City comments, West Yost will provide a final PDM. Meetings are budgeted under Task 2-4 Task Management and Meetings.

Task 2-3 Deliverables: Draft and Final Preliminary Design Memorandum in PDF format.

Subtask 2-4: Final Design of Proposed Facilities

Design period services are focused on preparing the drawings and technical specifications package for the City's use in obtaining bids from general contractors. The City will provide front end contract documents. Proposed activities include:

- Provide evaluation of existing geotechnical studies to determine if any additional geotechnical evaluations are required for the project design. West Yost will subcontract separately for limited geotechnical services if necessary. A budget of $30,000 has been assumed.
- Prepare design drawings and technical specifications for improvements at the site. This task includes preparation of design drawings for the scope of work presented herein and in accordance with the City's standard design criteria. Drawings will be prepared using AutoCAD software conforming to the City's digital submittal guidelines. Both the WTP and Harter Sites will be combined into one (1) set of contract documents and will include approximately forty (40) plan sheets as follows:
  - Title sheet;
  - Sheet index and vicinity map;
  - Abbreviations, Notes and Legend
  - Clark Avenue - Abandon Valve in Place Plan and Details (1 sheet);
  - WTP and Harter:
    - Civil (4 sheets)
    - Structural (7 sheets)
    - Mechanical (10 sheets)
    - Electrical (14 sheets)
- Provide 50 and 95 percent Preliminary Drawings, Opinions of Estimated Construction Costs and Technical Specifications for City review and comment.

- Meet with City staff to review and discuss City comments on the 50 percent draft design documents. Review and discussion of 95 percent comments will be via conference call.
- Provide Draft 100 Percent Final "check print" Drawings and Technical Specifications (this was not required in City's proposed scope of services request).
- Provide 100 percent Final Drawings and Technical Specifications sealed by a professional engineer.

Task 2-4 Deliverables: Draft documents (drawings, estimate of probable costs, and technical specifications) at 50 and 95% levels of completion will be provided in PDF format for City review and comment. A 100% "screen check" set will also be provided for City final approval prior to stamping and signing the document. Following City approval of the 100% submittal, a final, stamped and signed set of drawings and technical specifications will be provided to the City for bidding.

Subtask 2-5: Task Management and Meetings

Task management includes those general task management activities that are not specific to any one subtask. Work includes overall project management; coordination of activities and communication with City staff; coordination and management of West Yost subconsultants; quality control and quality assurance activities; and invoicing. The anticipated duration for the design services discussed above is anticipated to be approximately four (4) months.

Proposed meetings include:

- In-person Meetings: Three in-person meetings are assumed, one at design kick-off, one to receive and discuss City comments on the Draft PDM, and one to discuss City comments on the 50 percent draft plans and technical specifications.
- Conference Calls: One conference call to discuss 95% review comments and up to eight (8) thirty-minute check in conference calls have been assumed.

Short, (30 minute) check in conference calls will be initially scheduled between the West Yost project manager and the City's project manager, plus others by specific request (for budgeting purposes, eight (8) such conference calls have been budgeted). The in-person meetings could include a broader group to be determined, and as requested by the City. If additional meetings or unanticipated project management activities are required, these can be provided with a corresponding budget and schedule augmentation.

Task 2-5 Deliverables: Agenda for in-person meetings and conference calls, plus monthly invoices with a brief description of activities completed during the previous month.

TASK 3: BID PERIOD ASSISTANCE

Under this task, West Yost will assist the City during the bid period. Services to include:

Subtask 3-1: Attend Pre-bid Meeting

Project Manager will attend the construction pre-bid meeting and provide technical support to City staff relative to immediate contractor questions. Provide minutes of the meeting, attendee sign in sheet, list of attendees, and questions and responses.

Subtask 3-2: Respond to Bidder's Questions

West Yost will respond to requests for information (RFI) from the contractor during the bidding period. Task includes response to a total of 15 RFI's. We will maintain a log and notes on contact and responses. Task includes preparation of two (2) addenda.

Subtask 3-3: Conformed Contract Documents

West Yost will prepare conformed construction drawings and technical specifications based on input during the bid period.

Task 3 Deliverables: Provide construction pre-bid meeting minutes and responses in an electronic version (searchable pdf). Provide all addenda and logs of contacts during the bid period in electronic format (pdf). Provide one electronic copy (searchable pdf) of conformed contract documents.

Scope of Work Assumptions

The following assumptions were made in developing the Task 2 proposed scope of services and fee:

1. The scale of the proposed facilities is approximately as described above. The new surge control panels and air compressors at the WTP will be installed in a prefabricated FRP building, one building for each tank, to protect equipment and provide environmental protection reprieve for City engineering and maintenance personnel. Once the surge analysis is complete, specific mitigation measures will be selected by the City. The scope and fee for this task may be adjusted if the extent of the proposed mitigation measures differ from the assumed facilities.
2. City will determine the specific location for the facilities near the high lift pump station. As indicated above, the grassy area surrounding the existing meter vault appears to be appropriate. Using that site may require relocation of a flag pole that is shown on some drawings.
3. City will provide topographic and utility survey and record drawings of all areas to be included in the work.
4. West Yost will subcontract separately for limited geotechnical services. A budget of $30,000 has been assumed.
5. Structural design will be limited to tank foundations with housekeeping pads for three (3) tanks, slabs for two pre-fabricated FRP buildings and seismic stability design for the hydropneumatics tanks. Special foundations systems (e.g., piers/piles) are not required.

6. Coordination with local permitting agencies or permitting documents for the planning department, building department, and fire department are not required including preparation of Title 24 Energy Compliance forms.
7. Work will include restoration of disturbed grassy areas, but landscape design will not be required.
8. Drawings and Technical Specifications (Divisions 1-16) in Construction Specifications Institute 16 Division Standard will be provided. City will add Division 0 and contracting requirements and will advertise for bids.
9. Engineering services during construction of the proposed facilities, and construction management services are not included, but can be added later.
10. City staff is responsible for providing all requested data, timely review of work products within two (2) weeks of receipt and being available to meet with West Yost to review and discuss City comments on draft work products.
11. Design fees are based on 2018 rates and it is assumed design will be substantially completed in 2018.
12. Current, updated copies of I&C and Electrical record drawings of the WTP and Harter facilities will be provided to TJCAA for reference.
13. Design will comply with the requirements of the 2016 California Electrical Code.
14. Suitable power sources for the 480V and 120V equipment is available and ready for connection under this Project. Expansion to of modifications of existing electrical distribution equipment other than location of feeder circuit breakers in existing spaces is not included.
15. Surge tank controls and air compressors are assumed to be specified as packaged system with all ICE elements provided by the surge tank supplier other than the 480V feeder and SCADA system interconnection.
16. At WTP, prefabricated building shall be provided for each surge tank. Building electrical (lighting, distribution, etc.) is assumed to be provided by the prefabricated building supplier. Detailed electrical design for the prefabricated buildings will not be required.
17. Control design assumes system integration will be performed as a sole source specification to Tesco Controls. Control system work will include development of P&IDs, preparation of I/O lists, and creation of suitable control loop descriptions for integration into the site control system. Documentation for the existing control system elements is assumed accurate and control system configuration requirements are well defined.
18. Design calculations will be provided with the Bid Documents. Interim design calculations will not be provided

If the above-listed assumptions are determined to be incorrect during project execution, the Project schedule could be affected. The West Yost team can complete the work needed with appropriate adjustments to the contracted scope, schedule, and fee.