

Proposal to Provide Reuse Master Plan Work Order No. 3

Services to be provided by: Hazen and Sawyer (Hazen)

Services provided to (“Village”): Village of Wellington (Village)

Proposal Date: January 25, 2018

Proposal Terms

PROJECT DESCRIPTION

Hazen will provide general engineering services for preparation of a Reuse Master Plan for the Village. The planning area under the Reuse Master Plan is for the entire Village of Wellington service area geographical boundary. Development of the Reuse Master Plan will be coordinated with the development of the Consumptive Use Permit, Water Treatment Plant Master Plan, Reclaimed Water Master Plan and Comprehensive Water Supply Plan in separate work orders, as illustrated in the flow chart appended to this work order.

A scope of work has been prepared based on Hazen’s understanding of the project, knowledge of the Village’s utility and its operation, utility industry standards, and information and discussions with the Village staff. The scope of work has been developed with the intent of determining the requirements for future utilities infrastructure and an implementation plan for the resultant Capital Improvement Program, including scheduling and costs. The identified timeframe for this planning horizon is 10 years.

Hazen will prepare the 10-year Reuse Master Plan to be used primarily as a guide for capital improvements planning and implementation. The Reuse Master Plan will address the following areas, as discussed in the scope of work:

- Potential reclaimed water customers and demands
- Mitigation of reclaimed water impacts to surface water phosphorous loadings
- Reclaimed water production capacity
- Potential alternative water supply offsets to increase consumptive use permit allocation
- Reclaimed water storage and pipeline distribution to potential customers
- Funding and opportunities, including virtual reuse (Chapter 2013-31, Senate Bill 444)
- Capital improvement plan and implementation schedule

SCOPE OF SERVICES

Task 1 – Project Initiation

Hazen will organize and lead a kick-off meeting with the Village staff and key members of the project team. During this meeting, the overall work plan and schedule will be discussed, lines of communication will be established, and data needs will be assessed. It is anticipated that the Village will provide Hazen with required data within the first four weeks following receipt of a Project Notice-to-Proceed. Data that are expected to be required include, but are not limited to, the following:

1. Existing reclaimed water user agreements or commitments
2. Applicable data, maps, permits associated with the Village's Consumptive Use Permit and Diversion and Impoundment Program Permit File
3. Applicable data, maps, permits associated with the Village's surface water management system as amended.
4. Existing Sub-Agreements associated with Diversion & Impoundment Permit or Water Use Connection Permits to Wellington Surface Water Management System.
5. Higgins Reports.

Key elements will be discussed during the kick off meeting. Kick-off meeting minutes will be prepared and distributed by the Hazen.

Deliverable(s):

1.1 – Minutes from project kick-off meeting

Task 2 – Identify Reclaimed Water Customers and Demands

Hazen will develop a potential reclaimed water user database that will include the following information for each potential customer, including the Village:

1. Name, location/address; both in a listing and a service area map
2. Demand; including quantity, schedule, point of delivery, pressure requirement, etc.
3. Existing source of irrigation water (if applicable); surface water, groundwater well, other
4. Map of potential customers

A draft of the master plan chapter identifying potential reclaimed water customers and demands will be prepared and submitted to the Village for review. A review meeting will be held within two weeks of submission of the draft document to discuss comments on the draft master plan

chapter. Comments from the meeting will be documented in meeting minutes and incorporated as applicable in the final version of the master plan chapter.

Deliverable(s):

2.1 – Draft master plan chapter on potential reclaimed water customers and demands

2.2 – Minutes from review meeting

Task 3 – Maximum Sustainable Reuse Application (based on Phosphorous Loadings to Surface Waters)

Hazen will analyze reclaimed water impacts to surface water phosphorous loadings using an integrated approach that considers in-plant reduction of phosphorous from the water reclamation facility effluent and analysis of reuse phosphorous loading on surface waters. This integrated approach will be used to determine the maximum sustainable amount of reuse application within the Village's service area.

3.1 – Calibration of BioWin™ Process Model of the WRF

Hazen will develop a whole plant BioWin™ process model of the WRF under the Water Reclamation Facility Master Plan project (Work Order No. 2). Under Work Order No. 2, Hazen will also perform initial calibration of the model using historical plant operating data. Under this Work Order No. 3, Hazen will perform the following tasks to complete calibration of the model to special sampling data:

1. Hazen will prepare a special sampling plan identifying locations and types of samples to be collected by the Village. Hazen will meet onsite with Village staff to coordinate requirements for sample containers and upcoming laboratory analysis. It is assumed that the Village will perform/pay for all laboratory analyses. Hazen will review, and tabulate sampling results for use in calibrating the whole plant BioWin™ model.
2. Calibrate the whole plant process model, including interaction between liquids and solids process streams; generate process data tables and graphs of applicable process flow streams and process parameters to demonstrate level of calibration.

3.2 – Analyze In-Plant Reduction of Phosphorous from WRF Effluent

Hazen will utilize the whole plant BioWin™ model calibrated in Task 3.1 and other analytical tools to evaluate methods to reduce phosphorous in the WRF effluent. Potential in-plant phosphorous reduction methods:

1. Modify existing oxidation ditches for biological phosphorous removal
2. Additional phosphorous removal through chemical precipitation
3. Reducing phosphorus in plant recycle flows

4. Dosing iron salts at the headworks or in the collection system

Evaluation of each method will include descriptive narrative, conceptual process schematics, preliminary layouts, conceptual capital and life-cycle costs, and projected reduction in effluent phosphorous.

3.3 – Analyze Impact of Reuse Phosphorous Loadings on Surface Waters

Hazen will utilize the Watershed Assessment Model (WAM) to analyze the impact of reuse phosphorous loading on the Village’s surface waters. WAM has been used on other similar projects for modeling of phosphorous loadings in the adjacent Okeechobee watershed. Hazen will model each potential reuse site identified in Task 2 as a “source cell”. WAM modeling will take into account land uses, climate factors, soil properties, phosphorous concentrations in the surface water and phosphorous concentrations in WRF effluent phosphorous to determine the maximum sustainable reuse application at each source cell (reuse site).

3.4 – Integrated Analysis to Determine Maximum Sustainable Reuse Application

Hazen will integrate the results of Tasks 3.2 and 3.3 to develop a recommended approach to optimize maximum sustainable reuse application within the Village’s service area. The integrated analysis will include the following information:

1. Listing(s) and map(s) of feasible reuse sites and maximum potential demands
2. Improvements and conceptual costs for in-plant reduction of WRF effluent phosphorous
3. Impacts of reuse application rates on surface water phosphorous concentrations
4. Optimized approach to maximum sustainable reuse application

A draft of the master plan chapter addressing impacts of reuse application to surface water phosphorous concentrations and maximum sustainable reuse application will be prepared and submitted to the Village for review. A review meeting will be held within two weeks of submission of the draft document to discuss comments on the draft master plan chapter. Comments from the meeting will be documented in meeting minutes and incorporated as applicable in the final version of the master plan chapter.

Deliverable(s):

- 3.1 – Draft master plan chapter identifying impacts of reuse application to surface water phosphorous concentrations and maximum sustainable reuse application rates
- 3.2 – Minutes from review meeting

Task 4 – Required Reclaimed Water Production Capacity

Hazen will analyze the WRF reclaimed water treatment and pumping systems to identify existing total and firm reclaimed water production capacity; and to identify capital improvements required

to expand total and firm reclaimed water production capacity to meet maximum sustainable reuse application rates identified in Task 3. The analysis will include design criteria for tertiary filters and reclaimed water pumping facilities, conceptual layout drawings, and capital and life-cycle costs.

A draft master plan chapter identifying capital improvements required to expand reclaimed water production capacity to meet maximum sustainable reuse application rates will be prepared and submitted to the Village for review. A review meeting will be held within two weeks of submission of the draft document to discuss comments on the technical memorandum. Comments from the meeting will be documented in meeting minutes and incorporated as applicable in the final version of the master plan chapter.

Deliverable(s):

4.1 – Draft master plan chapter on required expansion of reclaimed water production capacity

4.2 – Minutes from review meeting

Task 5 – Reclaimed Water Storage and Distribution

Based on average and peak reclaimed water delivery rates developed in Tasks 2, 3 and 4, Hazen will perform the following tasks related to reclaimed water storage and distribution to proposed reclaimed water users:

1. Model and size reuse storage, pumping, and distribution piping with Innovyze / Infowater model
2. Evaluate and select reuse storage site(s) and reclaimed water piping corridors including the potential use of existing ponds/lakes for storage.
3. Develop map(s) of proposed reuse distribution system
4. Develop conceptual capital costs for new storage and distribution system

A draft of the master plan chapter summarizing reclaimed water storage, pumping, and distribution system improvements/extensions will be prepared and submitted to the Village for review. A review meeting will be held within two weeks of submission of the draft document to discuss comments on the draft master plan chapter. Comments from the meeting will be documented in meeting minutes and incorporated as applicable in the final version of the master plan chapter.

Deliverable(s):

5.1 – Draft master plan chapter on capacity analysis and recommended expansion projects

5.2 – Minutes from review meeting

Task 6 – Analyze Impact of Reuse (Alternate Water Supply) to Consumptive Use Permitting

The following scope describes the work to be performed by others under a separate work order with the Village with results incorporated in the Reuse Master Plan Report.

The expansion of the Village's reuse system has the potential to positively impact the Village's broader water supply issues, including SFWMD consumptive use permitting, the Diversion and Impoundment (D&I) program, and the ability to meet future water demands using fresh water from the surficial aquifer (as opposed to new investment in other more expensive alternative water supply sources).

The majority of large potential reuse customers currently source their irrigation supply from surface waters that recharge the surficial groundwater aquifer or directly from groundwater wells. The Village also sources their raw water supply for drinking water production from the same surficial aquifer. The Village (as a "primary user") and potential reuse customers (as "secondary" users) also participate in the Diversion and Impoundment (D&I) Program, which provides a fixed allocation from Water Conservation Area No. 1 (Loxahatchee Wildlife Refuge; lower total phosphorous, TP) or the C-51 canal (higher TP) to meet irrigation water demands within the Village and recharge the surficial aquifer.

Under a separate contract with a separate consultant, the Village has commissioned a groundwater modeling project to identify whether and how additional raw water from the surficial aquifer can be obtained by SFWMD consumptive use permitting and the Regional Water Availability Rule. This modeling will also investigate where removal of existing legal users of the Surficial Aquifer System or secondary users of the diversion and impoundment permit will be most effective and where recharge of the surficial aquifer will be most beneficial.

It is assumed that a draft of the master plan chapter summarizing reuse offsets to the consumptive use permit allocation will be prepared and submitted to the Village for review. A review meeting will be held within two weeks of submission of the draft document to discuss comments on the draft master plan chapter. Comments from the meeting will be documented in meeting minutes and incorporated as applicable in the final version of the master plan chapter.

Deliverable(s):

6.1 – Draft master plan chapter on reuse offsets to the consumptive use permit allocation

6.2 – Minutes from review meeting

Task 7 – Funding Opportunities, including Virtual Reuse

Hazen will investigate opportunities for outside funding of reuse capital projects, including federal and state grants associated with alternate water supplies, and the "virtual reuse" program established by Chapter 2013-31 of Senate Bill 444.

1. Virtual Reuse - Summarize history of virtual reuse, and challenges and opportunities that other south Florida utilities have encountered. Determine potential benefit of virtual reuse to the Village. Determine utilities that may potentially be interested in virtual reuse and attempt to quantify amount of reclaimed water capacity for each utility that may be interested in virtual reuse partnership. Attempt to roughly estimate funding that may be available (if possible). Contact the FDEP to confirm preliminary feasibility of virtual reuse strategies for the Village, and recommend path forward.
2. Other Funding Opportunities – Summarize other reclaimed water program funding opportunities, including the SFWMD Cooperative Funding Program. The agencies will be contracted, and the potential benefits and feasibility of obtaining funding will be summarized.

A draft of the master plan chapter summarizing funding opportunities will be prepared and submitted to the Village for review. A review meeting will be held within two weeks of submission of the draft document to discuss comments on the draft master plan chapter. Comments from the meeting will be documented in meeting minutes and incorporated as applicable in the final version of the master plan chapter.

Deliverable(s):

7.1 – Draft master plan chapter funding opportunities

7.2 – Minutes from review meeting

Task 8 – Implementation Plan – Costs and Schedule

Based on projects identified in previous tasks, Hazen will develop an implementation plan, as follows:

1. Develop list of improvement projects.
2. Develop capital cost estimates for all improvements. For this task, Hazen will develop Feasibility Study Level Opinions of Probable Cost. These Costs Opinions will be prepared to Class 5 Cost Estimate Levels based on the definition provided by the Association for the Advancement of Cost Engineering (AACE) International Recommended Practice No. 18R-97.
3. Prepare prioritization of improvement projects; prioritization will be based on multiple criteria including, but not limited to, required timing to meet projected capacity short-falls; required timing for renewal or replacement projects based on anticipated useful life of existing infrastructure; and timing of optimization improvements to maximize life-cycle cost savings.
4. Develop cost-loaded implementation schedule utilizing EXCEL spreadsheet.

A draft of the master plan chapter summarizing the implementation plan will be prepared and submitted to the Village for review. A review meeting will be held within two weeks of submission of the draft document to discuss comments on the draft master plan chapter. Comments from the meeting will be documented in meeting minutes and incorporated as applicable in the final version of the master plan chapter.

Deliverable(s):

8.1 – Draft master plan chapter on implementation plan

8.2 – Minutes from review meeting

Task 9 – Master Plan

This task will consist of preparation and assembling of the information developed from previous tasks into a general Reuse Master Plan. Included in the master plan will be project cost opinions and implementation schedules.

A draft Master Plan Report will be prepared and submitted to the Village for review. A review meeting will be held within two weeks of submission of the draft document to discuss comments on the draft Master Plan Report. Comments from the meeting will be documented in meeting minutes and incorporated as applicable in the final version of the Master Plan Report within two weeks of the review meeting.

Deliverable(s):

9.1 – Draft master plan report

9.2 – Minutes from review meeting on draft master plan report

9.3 – Final master plan report

ASSUMPTIONS

1. For process modeling in Task 3, the Village will provide the following:
 - a. One full-time operator equivalent for assistance during sampling event
 - b. Services of an outside laboratory as required for analysis not performed directly by Village staff
 - c. Laboratory space for preparation of wastewater samples by Hazen

SCHEDULE

Task	Description	Time of Completion from NTP
1	Projection Initiation	1 month
2	Identify Reclaimed Water Customers and Demands	2 months
3	Maximum Sustainable Reuse Application	4 months
4	Required Reclaimed Water Production Capacity	5 months
5	Reclaimed Water Storage and Distribution	6 months
6	<i>Analyze Impact of Reuse (AWS) to Consumptive Use Permit</i>	<i>7 months</i>
7	Funding Opportunities, including Virtual Reuse	8 months
8	Implementation Plan – Costs and Schedule	9 months
9	Master Plan Report	10 months

COMPENSATION

Compensation for all tasks, unless specifically noted below, will be billed on a lump sum basis based on percent of work complete and total project fees presented in Attachment A.

AUTHORIZATION

Work described in this proposal will commence upon authorization to proceed and receipt of a signed agreement.

Hazen and Sawyer, D.P.C.

Signed: Albert Muniz

Name: Albert Muniz, PE

Title: Vice President

Date: January 25, 2018

Village of Wellington

Signed: _____

Name: _____

Title: _____

Date: _____

[Please return one original to Hazen and Sawyer]

BUDGET SUMMARY - Lump Sum

Task No.	Description	BUDGET SUMMARY for Work Order No. 3							
		Vice President	Senior Associate	Senior Principal Engineer	Engineer/ Asst Engr	Principal Designer	Office	Total Labor	Sub-Consultant
1	Project Initiation	4	4	4	0	0	2	14	\$3,200
2	Identify Reclaimed Water Customers and Demands	2	4	0	0	4	4	14	\$10,000
3	Maximum Sustainable Reuse Application							0	\$0
3.1	Calibration of BioWin Model							0	\$0
	Special Sampling and Analysis	0	0	0	0	0	0	0	\$0
	Final Model Calibration	0	4	40	40	0	4	88	\$0
3.2	Analyze In-Plant Reduction of Phosphorous	0	4	40	40	0	4	88	\$0
3.3	Analyze Impact of Reuse Phosphorous on Surface Waters	0	8	0	0	0	4	12	\$30,000
3.4	Integrated Analysis of 3.2 and 3.3 Results	4	16	32	24	8	4	88	\$4,000
4	Required Reclaimed Water Production Capacity	0	4	8	8	0	4	24	\$0
5	Reclaimed Water Storage and Distribution	0	4	0	0	0	4	8	\$18,000
6	Analyze Impact of Reuse on CUP	0	0	0	0	0	0	0	\$0
7	Funding Opportunities, including Virtual Reuse	8	8	24	0	4	4	48	\$0
8	Implementation Plan - Costs and Schedule	4	8	16	24	0	0	52	\$0
9	Master Plan Report	12	20	24	40	24	24	144	\$4,000
	SUB-TOTAL	34	84	188	176	40	58	580	\$69,200
	Labor Raw Costs	\$218	\$196	\$145	\$105	\$114	\$73		
	Labor Sub-Total	\$7,412	\$16,464	\$27,260	\$18,480	\$4,560	\$4,234		
	Labor Total							\$78,410	
	Subconsultant Labor Total	\$69,200							
	Subconsultant Multiplier	1.0							
	Subconsultant Total	\$69,200							
	Reimbursable Expenses	\$1,000							
	Project Total	\$148,610							