



CITY OF DURHAM | NORTH CAROLINA

Date: April 15, 2014

To: Thomas J. Bonfield, City Manager

Through: W. Bowman Ferguson, Deputy City Manager

From: Donald F. Greeley, Director, Water Management

Subject: Water Reclamation Facilities Master Plans
Engineering Services Contract - Amendment #2

Executive Summary

On August 16, 2010 City Council awarded a professional engineering consulting services contract to Hazen and Sawyer, P.C. for the Water Reclamation Facilities (WRF) Master Plan Projects at the North Durham Water Reclamation Facility (NDWRF) and the South Durham Water Reclamation Facility (SDWRF). The scope of services included developing master plans for each WRF to achieve compliance with either the Falls Lake Rules (NDWRF) or Jordan Lake Rules (SDWRF). The scope also included energy management strategies; major facility management mapping; and design, permitting, and construction related services (CRS) for various improvements identified in the 2008 Optimization Study and the finalized WRF Master Plans.

During master planning, the City and Engineer agreed to modify the schedule and scope of the contract to add chemical related improvements that were not anticipated in the original contract negotiations. These items were included in Amendment #1.

Amendment No. 1, dated September 6th 2012, added design and permitting services for projects developed as a result of master planning. Summarily, these projects included aeration basin and piping modifications at both WRFs; chemical storage and feed improvements at each WRF; demolition at the NDWRF; and a new side stream treatment facility at the SDWRF. Amendment No. 1 did not include CRS for the additional design projects. Details for CRS scopes of work were developed once the designs were complete.

This proposed Amendment No. 2 adds CRS for the recently-bid NDWRF and SDWRF Chemical Systems and Nutrient Related Improvements project; engineering services for bidding the NDWRF Back-up Power System Upgrade project separately from the nutrient related improvements job; design for new Supervisory Control and Data Acquisition (SCADA) systems to communicate with process elements of the NDWRF and SDWRF Chemical Systems and Nutrient Related Improvements project; and crediting this contract for unused engineering services associated with cancelling modifications to the SDWRF Administration/Lab building. Staff anticipates there being no further amendments to this contract.

Recommendation

The Department of Water Management recommends that the City Council:

1. Authorize the City Manager to execute a contract Amendment with Hazen and Sawyer, P.C.

- for engineering services for the Water Reclamation Facilities Master Plans Project in the total amount not to exceed \$714,828.00; and
2. Authorize the City Manager to negotiate change orders for the contract provided that the total project cost does not exceed \$3,540,729.00, which includes the revised total contract amount of \$3,432,630 plus remaining contingency.

Background

Durham's NDWRF and SDWRF discharge into two basins – the Neuse River Basin and the Cape Fear River Basin, respectively. Both basins have had nutrient reduction strategies imposed for several years; however rules adopted by the Environmental Management Commission (EMC) in recent years require even greater reductions than those imposed by the facilities' National Pollution Elimination Discharge System permits. The Falls Lake Rules were adopted in January 2011 and established milestone nutrient reductions for the NDWRF for 2016 (Stage 1) and 2036 (Stage 2). Similarly, the EMC adopted the Jordan Lake Rules in August 2009 requiring reductions in nitrogen and phosphorus discharge from the SDWRF by 2016. The deadline for compliance with the Jordan Lake Rule requirements for WRF discharges was subsequently extended to 2018 by Session Law 2011-394 signed into law July 1, 2011.

In order to address and develop plans to meet the requirements of these rules, the Department of Water Management commissioned WRF Master Plans for the North and South Durham WRFs, with City Council awarding a professional engineering consulting services contract to Hazen and Sawyer, P.C. on August 16, 2010. The scope of services included developing master plans and energy management strategies for each WRF; providing major facility management mapping; and providing design, permitting, and construction related services for various improvements identified in the 2008 Optimization Study and projects recommended in the Master Plans that were finalized in 2012.

During master planning, the City and Engineer agreed to modify the schedule and scope of the contract to add chemical related improvements that were not originally anticipated in the original contract negotiations. These items were included in Amendment No. 1. Amendment No. 1 of the contract added design and permitting services for projects developed as a result of master planning. Summarily, these projects included aeration basin and piping modifications at both WRFs; chemical storage and feed improvements at each WRF; demolition at the NDWRF; and a new sidestream treatment facility at the SDWRF. These projects are part of the recently-bid construction contract for the NDWRF and SDWRF Chemical Systems and Nutrient Related Improvements project.

Amendment No. 1 did not include CRS for the additional design projects. Details for their scopes of work were developed once the designs were complete.

As the NDWRF backup generator project proceeded into final design, a number of limitations with the existing plant power distribution system and schedule conflicts were identified by the City staff and Engineer. These were primarily Duke Energy's policy of not allowing any utility generator to be located upstream of their equipment and plant control system limitations. The inability to locate a single generator for the plant caused a contract delay and redesign of the generator system with multiple generators. Furthermore, to meet the Falls Lake deadline, the city needed to bid the nutrient related improvements job in November of 2013. The generator designs could not be effectively completed within that time which requires a separate bid schedule.

During the final design of the chemical and nutrient systems, it was determined that the existing plant SCADA system was incompatible with the high level of control needed for the processes

considered, unless major reprogramming and software/hardware additions were integrated. City staff and Engineer decided that a new version of a water/wastewater-specific software package (Wonderware) would be more efficient, flexible, cost less in the long-term, and require less integration. The Wonderware system can also readily accommodate future process expansion at the WRFs. Amendment No. 2 adds services associated with improving the WRF's SCADA systems.

The final element of the contract that has changed is cancellation of SDWRF Admin/Lab Building construction. In June of 2012, bids were received that were significantly higher than the City's anticipated budget. City staff recommended not moving forward until after a full Mist Lake Master Plan was complete. This would allow the City to make the best decision on the size and type of building required at the SDWRF to fit the overall needs of the Department.

Issues/Analysis

Amendment No. 2 will provide the following:

- additional construction related services for the recently-bid NDWRF and SDWRF Chemical Systems and Nutrient Related Improvements project;
- bidding services for the NDWRF Back-up Power System Upgrade project (described below);
- additional design and construction services for the WRF's SCADA systems; and
- a credit to the original contract for unused engineering services associated with cancelling modifications to the SDWRF Administration/Lab building.

Construction related services include construction administration (CA) and construction inspection (CI). The original contract estimated a 17 month construction time frame for its related design elements. The CI portion of the construction services was to have been performed by a single resident project representative covering multiple construction contracts simultaneously. Since additional and more complex design elements like SCADA and the proprietary biological process (AnitaMOX) have been incorporated, the construction windows will be expanded to 24 months at SDWRF and 18 months at NDWRF. Due to the complexities of the projects and the locations of the WRFs (opposite sides of the service area) it is now necessary to use a separate resident project representative for each site.

The NDWRF Back-up Power System Upgrade project was originally planned to be bid with the NDWRF and SDWRF Chemical Systems and Nutrient Related Improvements project. However, negotiations with Duke Power resulted in design modifications which significantly delayed completion of the final design. Therefore, a separate bidding for this project is needed; staff anticipates that the Power System Upgrade will be constructed during same time frame as the Chemical Systems and Nutrient Related Improvements project at NDWRF.

Additional design services are necessary to modify the NDWRF Back-up Power System upgrades and to prepare the Supervisory Control and Data Acquisition (SCADA) upgrade bid documents for both WRFs.

In 2012, the DWM elected not to proceed with construction of the SDWRF Admin/Lab Building Modifications. The Engineer had completed bidding services but not the construction related services for this portion of the work; therefore, the City will receive a credit of \$45,124.

The DWM negotiated fees for the additional services as summarized below. It is anticipated no further amendments to this contract are needed.

	Evaluation/Design	Construction Admin	Construction Inspection	Total
Amendment 2 Elements:				
Additional Construction Related Services	NA	\$90,820	\$464,881	\$555,701
NDWRF Back-up Power System Upgrades	\$48,701	\$20,490	NA	\$69,191
SCADA System Upgrades	\$45,660	\$89,400	NA	\$135,060
Credit - SD Admin Building	NA	(\$45,124)	NA	(\$45,124)
Subtotal Amendment No. 2	\$94,361	\$155,586	\$464,881	\$714,828
Current Contract Amount (Original + Amendment 1)				\$2,708,982
Current Council Authorized Contingency				\$116,919
Total Amended Contract Amount Plus Contingency				\$3,540,729

Alternatives

An alternative would be to reduce the proposed CA/CI services and proceed with construction using DWM staff. Currently staff does not have the availability or sufficient plant inspection experience. This may result in improper construction, construction delays, and possibly not meeting the performance requirements of the constructed systems. Also, if construction and inspection are not completed in a timely fashion, the City’s compliance with the Falls Lake and Jordan Lake rules could be compromised/jeopardized; resulting in violations and fines assessed by the State.

Financial Impacts

Funding for this amendment is available in the Wastewater Process Rehabilitation Project which is part of the City’s Capital Improvement Program. The funds are currently available in the project accounts:

Capital Project	Account Code	Amount
Wastewater Process Rehabilitation	4100P767-731003-P251C	\$714,828.00

SDBE SUMMARY

This is a contract amendment. Hazen and Sawyer, PC will be using the following SDBE firm for the additional scope of services:

Firm	ID	City/State	Amount	% of Contract
BREE & Associates, Inc.	MSDBE	Durham, NC	\$199,062	27.4%