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COUNTY OF ERIE

MARK C. POLONCARZ
COUNTY EXECUTIVE

September 29, 2016

Erie County Legislature
92 Franklin Street, 4th Floor
Buffalo, New York 14202

RE: Erie County Sewer District No. 6
Engineer Term Contract Agreement
CRA Infrastructure & Engineering, Inc.
Work Order: CRA-9

Dear Honorable Members:

Enclosed please find a memorandum from the Department of Environment and Planning, Division of Sewerage Management, for the issuance of a work order as authorized by the resolution passed by the Erie County Legislature on November 8, 2012, related to 3-year Term Agreements.

Should your Honorable Body require further information, I encourage you to contact Joseph L. Fiegl, P.E. in the Division of Sewerage Management. Thank you for your consideration on this matter.

Sincerely,

Mark Poloncarz, Esq.
Dpty Erie County Executive

MCP:MAS:cs

cc: Joseph Fiegl, Deputy Commissioner, Division of Sewerage Management

MEMORANDUM

To: Honorable Members of the Erie County Legislature
From: Department of Environment and Planning
Re: Erie County Sewer District No. 6
Engineer Term Contract Agreement
CRA Infrastructure & Engineering, Inc.
Work Order: CRA – 9
Date: September 29, 2016

SUMMARY

The Erie County Legislature is requested to receive and file this communication pertaining to the Department of Environment and Planning's issuance of a work order with GHD Consulting Services, Inc. (formerly CRA Infrastructure & Engineering, Inc.) for Erie County Sewer District No. 6 in the amount not to exceed $16,700.00.

FISCAL IMPLICATIONS

There will be no impact on to the County's General Fund. The cost of the engineering work related to this communication will be paid from the Erie County Sewer District No. 6 Capital Account C.00064.

REASO NS FOR RECOMMENDATION

The Division of Sewerage Management has issued work order CRA-9 to GHD Consulting Services, Inc. (formerly CRA Infrastructure & Engineering, Inc.) to provide supplemental evaluations in support of the No Feasible Alternative Analysis for Erie County Sewer District No. 6. This Analysis is required to meet the compliance schedule set in the Lackawanna Wastewater Treatment Plant (WWTP) State Pollutant Discharge Elimination System (SPDES) permit.

BACKGROUND INFORMATION

On November 8, 2012, the Erie County Legislature passed a resolution authorizing a 3-year Term Agreement with CRA Infrastructure & Engineering, Inc., now GHD Consulting Services, Inc. for engineering services for small and/or time critical projects. At the time of the contract award, the Division of Sewerage Management committed to notifying the Honorable Legislature of each work order issued.

The Term Agreement was approved to provide the Division of Sewerage Management with engineering services required to complete various initiatives throughout the Erie County Sewer Districts. GHD will provide supplemental evaluations in support of the No Feasible Alternative Analysis for Erie County Sewer District No. 6.

CONSEQUENCES OF NEGATIVE ACTION

This is a receive and file item.

STEPS TO FOLLOW APPROVAL

This is a receive and file item.

Thomas R. Hersey, Jr.
Commissioner

MAS:cs

Encl.
Cc: J.Fiegl/0.11.0 Leg Ltr. (w/encl)
M. Salah/J.Carr/0.3.2GHD

WORK ORDER NO.CRA-9

ENGINEER: **GHD Consulting Services, Inc. (Formerly CRA Infrastructure & Engineering, Inc.**

CONTRACT DATE: **November 8, 2012**

1. **Title of Proposal:**
   Supplemental Lackawanna STP Evaluations

2. **Name and Business Address of Proposer:**
   GHD Consulting Services, Inc.
   285 Delaware Avenue, Suite 500
   Buffalo, NY 14202

3. **Name, Title and Address of Principal Bearing Technical Responsibility:**
   Paul J. McGarvey, P.E.
   Project Director
   285 Delaware Avenue, Suite 500
   Buffalo, NY 14202

4. **Effective Dates of Proposal:**
   September 9, 2016

5. **Brief Description of Work for Which Proposal is Submitted.**
   The Engineer will provide supplemental evaluations in support of the No Feasible Alternative Analysis for Erie County Sewer District No. 6.

6. **Engineering Cost:** $ 16,700.00

7. **Source of Funds:** ECSD No.6 Capital Account No. C.00064

8. **Project No.:** CRA-9

9. **Attachments:** GHD letter (7 pages) date 9-2-16

10. **File:** 0.3.2 CRA (13-15)

DATE: 9/9/16

Prepared by: _____
Matt A. Salah, P.E.
Sr. Coor. Sewer Construction Projects

Accepted By: _____

Authorized By: _____
Joseph L. Fiegl, P.E.
Deputy Commissioner

September 2, 2016

Reference No. 630976

Joseph L. Fiegl, PE
Deputy Commissioner
Erie County Department of Environment and Planning
Division of Sewerage Management
95 Franklin Street, Room 1034
Buffalo, New York 14202

Dear Mr. Fiegl:

Re: Professional Engineering Services Proposal
Supplemental Lackawanna Sewage Treatment Plant (STP) Evaluations

1. Introduction

As discussed, GHD Consulting Services Inc. (GHD) is pleased to offer this proposal to the Erie County Department of Environment and Planning, Division of Sewerage Management (DSM), under our existing Term Services Agreement, for supplemental evaluations in support of the No Feasible Alternative Analysis (NFA) for Erie County Sewer District (ECSD) No. 6.

The original project scope focused on developing an evaluation that integrated the NFA, percent removal, ammonia and total residual chlorine evaluations mandated by the District's State Pollutant Discharge Elimination System (SPDES) Permit. As the evaluations progressed, the need to adjust the scope to better serve the needs of the project became apparent. Although these adjustments netted an increased effort, the modified approach allowed GHD to focus on critical items essential to completion of the evaluation and reduce the emphasis on options that were found to be unfeasible—based upon this evaluation and recent developments in particular within the Buffalo Sewer Authority's (BSA) system.

The two options included in the Scope receiving reduced emphasis were: Option 11 – Plant Expansion to 41 mgd, and Option 12 – Direct a 41-mgd peak flow to the BSA under a Regional Approach. The scope included a relatively small effort of developing high-level construction cost estimates based on a cost/million gallons approach. However, it was quickly determined that neither option would be feasible nor obtain regulatory approval due to technical concerns. For example, a 41-mgd wastewater treatment plant would have a capacity of more than 13 times the District's average flow—typically biological treatment systems are limited to 2.5 to 3 times capacity for proper operation. Also, the cost to address combined sewer overflow (CSO) impacts to address a 41-mgd peak flow under the Regional Approach would far exceed the estimate for Option 8 (conveying 16 mgd to the BSA), which was already determined to be cost prohibitive. To fully address this scope item, GHD will include a discussion of the qualitative analysis and a potential capital cost range associated with Options 11 and 12 in the final report.

Another scope item that received reduced emphasis during preparation of the report was an evaluation of the operational and maintenance (O&M) cost elements associated with the individual alternatives. The

O&M costs were to be considered for the short listed options; during preparation of the proposal we assumed that four options would be short listed. However, after the technical evaluation of the alternatives including development of capital costs, it became clear that only one option would likely be feasible. The remaining options either were not technically feasible or had capital costs that would exceed any O&M benefit. This being the case, GHD felt that a full evaluation of the O&M costs was not warranted. Instead, the O&M elements were described qualitatively for the NYSDEC submission. This cursory review suggested that the O&M costs for most options would likely be similar in the long term. However, GHD will include the annual O&M costs for the recommended alternative and the Regional Watershed Approach (Option 8) in the finalized report that addresses NYSDEC comments. Because only two options will have O&M costs evaluated, we offer a credit of $1,800 to the DSM for this evaluation.

The scope for completing the NFA and associated treatment evaluations also was based on maximizing use of previous evaluations, particularly the efforts in evaluating the conveyance of ECSD No. 6 flow to the BSA (Regional Watershed Approach) and existing Lackawanna STP capacity. As the NFA progressed, we found that some key information was needed and that changes have occurred to system operations since the Regional Watershed Approach evaluations were completed. Therefore, GHD performed several supplemental tasks (described below) to obtain the necessary information for fully evaluating the NFA options, and facilitating NYSDEC review and ultimate approval. The benefit of these evaluations was evidenced during a recent meeting with the NYSDEC in which they complimented the completeness and quality of information presented.

2. Project Scope of Work

The proposed Scope of Work for the supplemental tasks is as follows:

Task 1 – Lackawanna STP Hydraulic and Treatment Capacity Analysis

During assessment of the various treatment upgrades to address new ammonia and residual chlorine limits, as well as treatment plant expansion options, it became apparent that a supplemental hydraulic capacity analysis was needed. This analysis would identify potential hydraulic bottlenecks in the treatment plant to properly assess how changes to the processes and flow would impact the STP's ability to continue to convey and treat existing wastewater flows, as well as to handle additional flow into the plant and through each treatment process. Included in this analysis was the development of a full hydraulic model of the plant as well as an evaluation of how changing lake levels can impact the ability of the treatment plant to process wastewater. This evaluation identified the need to potentially reactivate the existing effluent pumping station to convey flows to Smokes Creek under higher flows and/or lake levels. Hydraulic impacts at the plant, in particular the hydraulic capacities of individual treatment processes, were not evaluated under previous efforts. Under this task, a series of hydraulic profiles were developed using a computer model (Visual Hydraulics). Because the plant includes an intermediate pumping station, two separate model segments were required: 1) from the plant influent to the intermediate pumping station influent and 2) from the intermediate pumping station effluent to the plant outfall. These models are based on existing record drawing information and generally calibrated using input from plant operations staff, as

well as measurements of available freeboard in the various tanks and at weirs during a variety of flow conditions. Varying water surface elevations in Lake Erie/Smokes Creek were input into the model as boundary conditions since the water surface of Smokes Creek is heavily influenced by seiche effects from Lake Erie. Simulations for five scenarios were needed to evaluate plant hydraulic performance and determine the maximum plant capacity. The results of this analysis were incorporated into the NFA report, including estimated construction costs to address predicted hydraulic deficiencies at high plant flow rates and/or high lake/creek levels.

A previous study of the treatment capacity of each plant unit process was completed in 1989 by Malcolm Pirnie, along with an addendum in 1991. However, it was determined for due diligence purposes to reassess unit process treatment capacity based on current operating practices to validate the original detailed assessment of the facility. In addition to current operations, the verification also considered the latest design guidelines from the Ten States Standards (2014) and current treatment plant performance and design practice. In addition, the ammonia evaluation considered new operating data collected since the Regional Watershed Approach evaluations were completed in 2010. The results of this assessment were incorporated into the NFA report.

Task 2 – Evaluation of Soluble Biochemical Oxygen Demand (BOD) and Assessment of Current Method Used for Calculating ORF Total Suspended Solids (TSS) and BOD Removals

As stated above, percent removal for BOD and TSS was a large component of the overall evaluation. While the new permit does not specifically state what the ultimate percent removals must be, the results of the study may ultimately be used as the basis for percent removal requirements in the future. Soluble BOD analyses are used to estimate the amount of BOD that cannot be removed using primary treatment or filtration. After the start of the NFA project, it was determined that an analysis of the soluble BOD in the waste stream would facilitate evaluation of treatment options to increase BOD removals at the both the plant and the ECSD No. 6 Overflow Retention Facility (ORF). This information was intended to identify the maximum level of treatment that can be achieved at the ORF without implementing an additional biological treatment process. At the start of the NFA evaluations, soluble BOD data was not available as it is not typically analyzed for the plant or the ORF. Using a program developed specifically for the NFA evaluation, District personnel collected and analyzed a number of samples under a variety of flows and loadings at both the plant and the ORF. GHD conducted a supplemental evaluation of the soluble BOD data to determine the feasibility of improving upon BOD removal and treatment options.

As part of the percent removal component of the NFA, GHD noted that the ORF TSS and BOD removals reported by the DSM were substantially higher than what would be expected for the ORF, given the fact that at best an ORF provides primary treatment or sedimentation. Extensive discussions with the DSM revealed that the parameters used to calculate percent removal at the ORF had changed since the issuance of the new SPDES permit in November 2012; the process currently follows the method established in the NYSDEC's *DMR Manual* for the calculation of percent removals through treatment facilities. It was acknowledged that determining percent removals in the ORF is highly challenging due to the intermittent nature of ORF use and the varying overflow event durations/sampling frequency. The varying event durations can lead to few opportunities to collect samples and higher strength

concentrations for shorter duration events compared to longer events with multiple grab samples that become less concentrated as the event progresses. The intermittent use of the ORF can result in monthly averages being determined based on as few as one data point as dictated by the DMR Manual. Compounding the issue is the fact that the "monthly average effluent" concentrations for the ORF are compared to "monthly average influent" data at the plant, which includes all influent sample results regardless of wet weather. To address these challenges identified after the NFA project had started, GHD implemented a supplemental methodology to determine current ORF only treatment effectiveness to establish a basis upon which to compare alternatives.

Task 3 – Evaluation of Ammonia Permit Dilution Factor

As part of the NFA evaluation, we reviewed the SPDES permit fact sheets used to develop the ammonia permit limit. This review showed that the NYSDEC did not apply the dilution factor for Smokes Creek to the ammonia water quality standard, while the dilution factor was used to determine all other water quality based effluent limits in the permit. The absence of a dilution factor for ammonia led directly to a significantly lower permit limit than was expected. In order to assess the impact of this difference on the recommended alternative, as well as on the implementation cost, it was determined that the NFA evaluation needed to address the potential that a higher ammonia permit limit may be allowed if the dilution factor could be applied. Therefore, as directed by the DSM, GHD performed a supplemental evaluation to address two possible ammonia permit limits in the analysis, recommendations and proposed compliance schedule presented in the NFA report.

Task 4 – Updating ECSD No. 6 SWMM Model

A critical tool for assessing the response of the collection system, in particular the ORF and associated discharges to Smokes Creek, to the various alternatives was the existing SWMM model of the ECSD No. 6 collection system that was originally developed and calibrated in 2006. During proposal preparation, it was assumed this model could be directly used for the NFA evaluation. However, as the evaluation progressed, it was found that new ECSD No. 6 operations staff significantly modified their wet weather operating plan in an effort to further maximize treatment of wet weather flows. These changes, implemented after the model was calibrated, resulted in model results that did not represent the current performance of the ORF and collection system, and as such, did not accurately predict ORF use. In addition, the SWMM model control rules were modified to reflect the actual configuration and operation of the ORF diversion chamber. Therefore, it was determined that the hydraulic model required refinement to enable it to be used as an evaluation tool for the NFA. GHD incorporated the modified wet weather operations in ECSD No. 6 as well as the actual diversion chamber operation into the operating rules of the SWMM model, and performed verification modeling to confirm the simulation results were representative of current collection system operation.

Task 5 – NYSDEC Coordination Assistance

The NFA scope included effort for one meeting with the NYSDEC to discuss the NFA report, which occurred on July 13, 2016. The outcome of this meeting appeared positive. The NYSDEC was planning to

review the ammonia dilution factor, but also offered another alternative (discharge directly to Lake Erie) for consideration. GHD had previously evaluated this option but discounted it due to the fact that when the current permit limits were established for the Southtowns AWTF it did not appear that the resulting ammonia limit would eliminate the need for supplemental ammonia treatment. Therefore, GHD suggests an allowance for a supplemental task to further address this option based upon a NYSDEC identified permit limit specific to ECSD No. 6 and to coordinate with the NYSDEC during the remaining regulatory review process. These efforts could include attending additional meetings and providing additional evaluations that the NYSDEC may request during the approval process, as well as incorporating these evaluations into the NFA document as required. We understand that the allowance will only be used upon authorization by the DSM.

3. Project Fee

GHD proposes to furnish the above Scope of Work for a not-to-exceed fee of $16,600, as summarized below:

O&M Cost Analysis	$ 1,800 (credit)
Task 1	$ 5,200
Task 2	$ 2,600
Task 3	$ 1,700
Task 4	$ 3,900
Task 5	$ 5,000 (allowance)
Total Not-to-Exceed Fee	**$16,600**

The ECDEP's Standard Cost Estimating Form is attached for you review.

We trust that this proposal meets the needs of the DSM and thank you for the opportunity to provide continued service on this important project.

Please do not hesitate to contact me if you have any questions or wish to discuss this proposal. Thank you very much again for the opportunity.

Sincerely,

GHD

Christopher P. Martin, PE
Sr. Project Manager

CPM/las/002

Attachment

cc: Michael J. Quinn, PE BCEE - GHD
Filing: Corr

COST SUMMARY FORMAT FOR ENGINEERING SUBAGREEMENTS

PART I - GENERAL

1. OWNER Erie County Department of Environment and Planning Division of Sewerage Management	2. PROJECT NO. ECDEP 3-Yr Term Services Agreement
3. NAME OF ENGINEER GHD Consulting Services Inc.	4. DATE PROPOSAL 9/1/2016
5. ADDRESS OF ENGINEER (Include Zip Code) 285 Delaware Avenue, Suite 500 Buffalo, New York 14202	6. TYPE OF SERVICE TO BE FURNISHED Supplemental Lackawanna Sewage Treatment Evaluations

PART II - COST SUMMARY

7. DIRECT LABOR (specify labor categories)	ESTIMATED HOURS	HOURLY RATE	ESTIMATED COST	TOTALS
Officer	0	78.00	$0.00	
Sr. Project Manager/Associate	14	57.00	$798.00	
Sr. Project Engineer	26	39.00	$1,014.00	
Peer Reviewer	2	44.00	$88.00	
Engineer - Level B	70	31.00	$2,170.00	
Engineer - Level A	42	26.50	$1,113.00	
CADD	4	24.50	$98.00	
Secretary	12	20.00	$240.00	
			0.00	
DIRECT LABOR TOTAL				$5,521.00

8. INDIRECT COSTS (specify indirect cost pools)	RATE	x BASE	ESTIMATED COST	
Overhead	160%	$5,521	$8,834	
INDIRECT COST TOTAL				$ 8,833.60

9. OTHER DIRECT COSTS			ESTIMATED COST	
a. Mileage			0	
TRAVEL SUBTOTAL				$ -
b. EQUIPMENT, MATERIALS, SUPPLIES (specify categories)	QTY.	COST	ESTIMATED COST	
Miscellaneous Equipment/Supplies			$90	
EQUIPMENT SUBTOTAL				$90
c. SUBCONTRACTS			ESTIMATED COST	
			$0	
			$0	
SUBCONTRACTS SUBTOTAL				$ -
d. OTHER (specify categories)			ESTIMATED COST	
Report Reproduction (M/WBE Subconsultant)			$ -	
OTHER SUBTOTAL				$ -
e. OTHER DIRECT COSTS TOTAL				
10. TOTAL ESTIMATED COST				$ 14,444.60
11. PROFIT 15% on all but 9a, b, c and d. 5% on 9b, c and d. 0% on 9a				$ 2,157.69
12. TOTAL PRICE			MAXIMUM UPSET COST	$ 16,602.29

ECDEP-CS-1