CHANGE ORDER NO. 1

Owner: Lake County Department of Public Works — Date: December 28, 2012

Project: Vernon Hills NCT WRF High Efficiency Blower Installation and D.O. Control

Owner's Contract No. PW 2012.019 — Engineer: Clark Dietz Inc.

Date of Contract Start: May 29, 2012 — Original Contract Amt: $60,550.00

You are directed to make the following changes in the Contract Documents:

Provide additional engineering services for design of Biological Nutrient Removal and other related services as described in attached Clark Dietz Inc. contract amendment #1 dated December 26, 2012

Reason for Change Order: To provide Biological Nutrient Removal at Vernon Hills Water Reclamation Facility as required by IEPA

CONTRACT PRICE		CONTRACT TIMES to Completion	
Original:	$ 60,550.00	Original:	May 30, 2012
Previous COs (ADD/DEDUCT):	$ 0	Previous COs (ADD/DEDUCT):	
This C.O. (ADD/DEDUCT):	$ 79,600.00	This CO (ADD/DEDUCT):	
Contract Price with all approved Change Orders:	$140,150.00	REVISED:	

Revised Completion Date: April 30, 2014

THIS DOCUMENT SHALL BECOME AN AMENDMENT TO THE CONTRACT AND ALL STIPULATIONS AND COVENANTS OF THE CONTRACT SHALL APPLY HERETO.

RECOMMENDED:

By: _____ _____
Engineer (Authorized Signature) Date

APPROVED:

By: _____ _____
Owner (Authorized Signature) Date

CONTRACT AMENDMENT #1
SCOPE OF SERVICES
December 26, 2012

The following items are included in Amendment #1 to the original Scope of Services included in the Professional Engineering Services for PW2012.0190 – Per executed agreement #12115.

This amendment includes additional modeling of the aeration system to assist in the decision to pursue a Biological Nutrient Removal (BNR) upgrade to the plant. Also included in this amended scope are the additional services required to include the selected BNR process in the bid documents for the plant improvements, as well as additional services during construction and updates to the Facility's O&M manual.

1. Biological Nutrient Removal (BNR) Modeling

1.1. Complete additional BioWin modeling of the aeration system to include the 5-Stage Bardenpho process per the LCPWD staff's request. The modeling was requested in an effort to improve the projected Total Nitrogen and Total Phosphorus removal results.

1.2. Complete additional BioWin modeling of the aeration system to include the A_2O process arranged as a 2-pass system and a 5-Stage Bardenpho system per the LCPWD staff's request. The modeling was requested in an effort to improve the projected Total Nitrogen and Total Phosphorus removal results.

1.3. Update the cost estimates in the Preliminary Basis of Design Report to include the 5-Stage Bardenpho and A_2O processes.

1.4. Update the Preliminary Basis of Design Report to reference the findings of the two (2) added process models. Updates to this Report also include a revised recommendation for the selection of the 2-pass process that can be operated as either a Bardenpho or A_2O process.

2. Engineering Design Basis Update

2.1. Prepare a Basis of Design Report for submittal to the IEPA for approval of the BNR process change. The report will be required by the IEPA to approve of the changes to the biological process. The report will be developed from the Preliminary Basis of Design Report completed by Clark Dietz. The report will show that the BNR process and selected blower arrangement will meet the year 2020 design flow of 6.0 mgd.

3. Final Design Phase

3.1. Design structural modifications to the aeration tank walls to allow for changes to the flow from cell to cell within the aeration tanks.

3.2. Design nitrate recycle pumps and mixers for the aeration tanks as part of the 5-Stage Bardenpho or A_2O process. These pumps and mixers will be tied to the plant SCADA system and/or the new DO and ORP probes to control their operation.

3.3. Design piping modifications to the existing aeration basins to allow for the various modes of operation for the BNR process.

3.4. Design power and SCADA improvements for the new equipment installed as part of the BNR process, including the pumps, mixers, and a master control panel.

3.5. Design chemical precipitation facilities (alum) for the removal of phosphorus to a level of less than 1 ppm per the anticipated NPDES requirements. The new chemical facilities will include metering pumps, storage tanks, and renovations as required to retrofit the existing north end of the Filter Building or Preliminary Treatment Building to house the Chemical Room. The new chemical precipitation system will be designed to supply alum to the Aeration Basins and the Aerobic Digesters. Fluidization or carrier water (non-potable) will also be added.

3.6. Conduct a partial site survey of the site for the addition of site piping as needed for the new chemical feed system to the aeration basins and aerobic digesters.

3.7. Design nitrate, ammonia, and phosphorus probes to monitor the level of these chemical elements within the final pass of the aeration basins.

4. Bidding Phase - No additional services required.

5. Construction Phase

5.1. Review shop drawings / submittals for the mixers, pumps, master control panel, chemical storage and feed equipment, and other equipment as required per the BNR design.

5.2. Process RFI's, change orders, and other paperwork associated with the additional work.

5.3. Review the O&M manuals for the additional BNR process equipment.

5.4. Conduct five (5) additional site visits to the site to review the installed equipment and to witness the various equipment startups as required.

5.5. Provide onsite services during startup and commissioning of the new aeration process control and chemical feed equipment.

5.6. Prepare Record Drawings in AutoCad based on the "As Built" mark-up drawings received by the County from the Contractor.

6. Post Construction Phase – Update O&M Manuals

6.1. Update the Facility's Operations and Maintenance Manual (O&M Manual) currently dated May 2007 – Division 400 Activated Sludge System. Updates will include:

6.1.1. The Facility Basis of Design.

6.1.2. The process operations and procedures to implement the new blowers, mixers, pumps, chemical feed equipment, and monitoring equipment. The report will also address the reconfiguration of the aeration basins to a Bardenpho system.

6.1.3. Provisions for the operation of the reconfigured aeration basins for Biological Nutrient Removal (BNR). The O&M manual will include suggested loading, process monitoring, and troubleshooting.

6.1.4. Operational changes as recommended by the IEPA, applicable WERF manuals, or the LCPWD staff.

REVISED SCHEDULE

The revised project schedule for the Project, based on the amended Scope of Services, is as follows:

1.	Approval or Amended Scope	January, 2013
2.	Review / Approve HSI blower submittal	January, 2013
3.	Submit Preliminary Design Memo (final)	January, 2013
4.	Submit Final Plans and Specifications	April, 2013
5.	Submit IEPA permit application	April, 2013
6.	Submit DCEO grant application	May, 2013
7.	Bid Opening	June, 2013
8.	County Board Approval of Contract	July, 2013
9.	Notice to Proceed for Construction	August, 2013
10.	Construction Complete	April, 2014

***CLARK DIETZ* - FEE ESTIMATE**
Blower Addition
Lake County Public Works - Vernon Hills NCT

	WORK TASKS	Project Director P-7	Sr. Engineer P-6	Project Manager P-5	Project Engineer P-4	Engr/ Sr. Tech P-3/T-4	Engr/ Tech P-2/T-3	Tech T-2	Total Hours / Task	Expenses	Task Total
1.	**BNR Modeling**								**28**		**$3,580**
1.1.	Develop a model of the 5-Stage Bardenpho system				6				6		$750
1.2.	Develop a model of the revised A2/O system to account for the 2-pass arrangement				6				6		$750
1.3.	Update cost estimates for the added models				4				4		$500
1.4.	Update the Preliminary Basis of Design Report				8				8		$1,000
1.5.	Review the model results and make a recommendation regarding the BNR selection			2					2		$290
1.6.	Project Management			2					2		$290
2.	**Engineering Design Basis Update**								**36**		**$4,660**
2.1.	Prepare a Basis of Design Report for the IEPA approval of the BNR approach				24				24		$3,000
2.2.	Finalize BNR selection and operation			4	4				8		$1,080
2.3.	Perform QA/QC.			4					4		$580
3.	**Final Design Phase**								**334**		**$43,330**
3.1	Structural Design of walls.		8				4		12		$1,660
3.2	Mixer and nitrate recycle pump selection / design.			8	24				32		$4,160
3.3	Nitrate recycle, RAS, and RAW piping design modifications.			8	24				32		$4,160
3.4	Electrical power design for pumps and mixers.		4	2	40				46	$100	$6,030
3.5	SCADA design for control of pumps, mixers, and blower master control panel.		8	8	80				96		$12,440
3.6	Design chemical precipitation facilities, including pumps, tanks, and controls			8	40	8			56		$7,040
3.6.1	Design site and facility piping for the chemical addition.			4	16	4			24	$50	$3,070
3.6.2	Calculate the anticipated alum dose rate required for chemical precipitation of Phosphorus			2	4				6		$790
3.7	Design nitrate, ammonia, and phosphorus monitoring equipment			2	4	4			10		$1,230
3.8	Conduct a partial site survey for the chemical feed system					12			12	$150	$1,470
3.9	Perform QA/QC.		8						8		$1,280
4.	**Bidding Phase**										
4.1	No added work										
5.	**Construction Phase**								**102**		**$13,440**
5.1	Review shop drawings (mixers, pumps, Master Control Panel)			2	16	8			26	$30	$3,200
5.2	Additional RFI, change order, etc. review			4	4				8		$1,080
5.3	Review contractor O&M manuals				4	8			12		$1,380
5.4	Additional site visits during construction (5 total)			16					16	$250	$2,570
5.5	Additional startup services (pumps, mixers, SCADA)			16		24			40	$250	$5,210
6.	**Post Construction Phase - O&M Manual Updates**								**112**		**$14,690**
6.1	Update the O&M Manual - Division 400 section		4	8	40				52	$50	$6,850
6.1.1	Update the Basis of Design calculations			2	4				6		$790
6.1.2	Include the new blowers, mixers, pumps, chemical feed, and monitoring equipment			4	20				24		$3,080
6.1.3	Include the BNR process and troubleshooting			4	20				24		$3,080
6.1.4	Add the operational changes recommended by IEPA and WERF			2	4				6		$790
	TOTAL HOURS		32	112	396	68	4		612		
	RATE/HR	$170	$160	$145	$125	$110	$95	$75			
	TOTAL COST		$5,120	$16,240	$49,500	$7,480	$380			$880	**$79,600**