WORK ORDER NUMBER 17

Floridan Wellfield Assessment and Improvements

This Work Order Number 17 is entered into as of this ___ day of _____, 2018, pursuant to that certain Extension and Amendment of Continuing Contract Agreement for Professional Services entered into as of this 4th day of November, 2014, (collectively referred to as the "Agreement") and that certain Extension of Continuing Contract Agreement for Professional Services entered into as of this 24th day of October, 2017 (collectively referred to as the "Agreement"), by and between INDIAN RIVER COUNTY, a political subdivision of the State of Florida ("COUNTY") and Kimley-Horn and Associates, Inc. ("Consultant").

The COUNTY has selected the Consultant to perform the professional services set forth on Exhibit A (Scope of Work), attached to this Work Order and made part hereof by this reference. The professional services will be performed by the Consultant for the fee schedule set forth in Exhibit B (Fee Schedule), attached to this Work Order and made a part hereof by this reference. The Consultant will perform the professional services within the timeframe more particularly set forth in Exhibit A (Time Schedule), attached to this Work Order and made a part hereof by this reference all in accordance with the terms and provisions set forth in the Agreement. Pursuant to paragraph 1.4 of the Agreement, nothing contained in any Work Order shall conflict with the terms of the Agreement and the terms of the Agreement shall be deemed to be incorporated in each individual Work Order as if fully set forth herein.

IN WITNESS WHEREOF, the parties hereto have executed this Work Order as of the date first written above.

CONSULTANT:
Kimley-Horn and Associates, Inc.

By: _____
Brian Good, P.E.
Title: Senior V.P.

BOARD OF COUNTY COMMISSIONERS OF INDIAN RIVER COUNTY

By: _____
Peter D. O'Bryan, Chairman

BCC Approved Date: _____

Attest: Jeffrey R. Smith, Clerk of Court and Comptroller

By: _____
Deputy Clerk

Approved: _____
Jason E. Brown, County Administrator

Approved as to form and legal sufficiency: _____
Dylan T. Reingold, County Attorney

EXHIBIT A

Work Order Number 17

Indian River County Department of Utility Services

Floridan Wellfield Assessment and Improvements

PROJECT UNDERSTANDING

Raw water is the lifeblood and the main source of water of the Oslo water treatment facilities (WTP) and Hobart water treatment facilities (WTP). With recent and more frequent wellpump motor failures at the Hobart water treatment plant, limitations in the South WTP wellfield controls and RTU system, and on-going wellfield improvements at the South Oslo road water treatment facilities, it is prudent to improve the sustainability and reliability of these wells.

The purpose of this project is to improve the sustainability and reliability of the wellfields and implement a plan to standardize equipment and operations of wells, improve reliability of the wellfields, and provide upgrades to the fiber optic and controls system for the wellfields. Standardizing equipment and operations will allow interchangeability of equipment among all of the wells, resulting in a more robust wellfield system.

SCOPE OF WORK

A thorough evaluation of the existing wellfield performances with respect to mechanical efficiency, specific capacity and performance, and electrical conditions will be provided.

TASK 1 – WELL PERFORMANCE - FIELD TESTING

Consultant will conduct well testing, collect field data, and update well performance data collected in December 2013.

Consultant will perform wellfield testing of fourteen (14) wells in the North and South wellfields (the new well S7 and S4 will not be included) which will consist of water quality parameter testing: sand, silt density index (SDI), turbidity, hydrogen sulfide, iron, pH, dissolved oxygen, and specific conductance; specific capacity testing, review of SCADA system logger data, static and pumping water levels, pumping rates, and specific capacity.

Consultant assumes instruments (flow, pressure, drawdown) are calibrated and functioning at the time of field testing and that all wells and wellpumps are in operation.

Consultant will prepare a technical memorandum of the field test results for IRCU staff review and attend one meeting to discuss findings. Consultant will update the existing table of well performance and prepare a graph depicting wellfield performance trends. Consultant will provide recommendations which may improve or enhance individual well performance.

Consultant will prepare table summarizing all the information and data collected for each of the wells.

TASK 2 – EVALUATE EXISTING WELLS and CONDUCT ASSESSMENT

CONSULTANT will attend a kick-off meeting to discuss the information and data collected on each of the wells to date and the current operational issues at each wellfield. Information on the individual performance of each well will be discussed.

CONSULTANT will conduct a 1 to 2-day walkthrough of each of the wellsites (14 total) concurrently with the field testing in Task 1, in order to assess current condition of each wellhead. CONSULTANT will prepare condition assessment summary, performance testing, wire/water efficiency data, and specific capacity performance.

Consultant will develop a raw water hydraulic model for both water treatment plants using WaterGEMS, specific capacity with intent to install wells on several wells

Consultant will review well pump control operations with respect to motor failures which have occurred more frequently than normal.

CONSULTANT will evaluate all of the existing wellpump capacities, pump curves and motors with respect to manufacturer, performance, pump selection, material, hardware used at each well, and inventory of spare pumps.

Consultant will help define spare parts inventory needed to improve wellfield reliability.

CONSULTANT will develop a table which outlines the specific requirements and information on each of the wells, wellpumps, and motors.

CONSULTANT will evaluate standby generator capability and potential limitations of existing standby power capacity.

CONSULTANT will evaluate the applicability of variable frequency drives (VFD's) at the wells which may warrant installation of VFD's. The evaluation will consider return on investment (ROI) and the additional maintenance and replacement costs which can be inherent with VFD installation at wells.

Consultant will review existing raw water quality data with respect to the design water quality used for membrane selection. Consultant will provide recommendation of impacts to treatment plant or if further and additional raw water quality analysis is necessary.

TASK 3 – SCADA SYSTEM and FIBER SYSTEM EVALUATION - WELLS

It is recommended to continue with the PLC upgrade project described in the Final Report – ***Water Plant SCADA Improvements Evaluation, May 2015***, and work completed in early 2016 (Refer to attached report schedule). The existing PLC and control system is antiquated, has been discontinued, replacements are difficult and costly to acquire, and Allen-Bradley has discontinued manufacturing and support of the PLC5 hardware, which comprises the majority of the hardware at both water plants. The completed system would provide all of the advantages noted previously and also allow for any future changes to well sequencing. This will also allow further well upgrades without installing additional CPU's at additional cost at each of the wells.

Consultant will review fiber optic (FO) system, and identify final improvements to complete the FO system to all wells at both water treatment plants. Consultant will review previous construction documents and record drawings, provide field investigations of each wellsite, and verify existing equipment at each well.

Consultant will review and identify individual well improvements to integrate FO at each well and develop a summary of improvements that can be designed for

implementation. Consultant will investigate the conversion of Hobart well panels to strictly remote I/O versus the existing PLC CPU and I/O at each well and provide a summary of recommentions.

Consultant will review the SCADA system programming and develop an automated wellfield matrix for each water plant. The current operation at Hobart wellfield includes manipulation of discharge check valve to potentially be closed during pump startup, therefore modification of this operation will be evaluated.

TASK 4 – PREPARE TECHNICAL REPORT AND DESIGN GUIDELINES

Consultant will prepare report on findings, recommendations, costs, summary of individual well improvements, auxiliary power requirements.

Consultant will prepare design guidelines for the improvements at each well, including sketches, costs, and list of improvements. Design of these improvements (VFD's, FO, auxiliary power if needed) is not included in this scope, but can be provided as additional services.

CONSULTANT will finalize summary report after review meeting and furnish up to six (6) copies of report, including electronic in PDF format.

Consultant will attend a coordination meeting to discuss the report on the findings.

Summary of Items to Complete

OSLO WTP

- Review fiber optic (FO) system, identify final improvements to complete FO to all wells
- Identify individual well improvements to integrate FO at each well (C&W, CSD)
- Conduct well testing and update well performance data – specific capacity, water quality, well pump data (JLA)
- Evaluate existing well pump/flows – pump curves, develop RWM model, specific capacity with intent to install VFD's on several wells
- Prepare table of complete well data
- SCADA review & programming for wellfield matrix, etc. (CSD)
- Prepare report on findings, recommendations, costs, auxiliary power (JLA, CSD, C&W)
- Update design water quality to plant

- Define spare parts to improve wellfield reliability
- Design improvements (VFD's, FO, auxiliary power if needed) – FUTURE SCOPE

HOBART WTP

- Evaluate well motors & S/S issues
- Review existing FO system, integrate standardization with wells
- Identify individual well improvements to integrate FO at each well (C&W, CSD)
- Conduct well testing and update well performance data – specific capacity, water quality, well pump data (JLA)
- Evaluate well pump/flows – pump curves, develop RWM model, specific capacity with intent to install wells on several wells
- Prepare table of complete well data
- SCADA review programming for wellfield matrix, etc. (CSD)
- Prepare report on findings, recommendations, costs, auxiliary power (JLA, CSD, C&W)
- Update design water quality to plant
- Define spare parts to improve wellfield reliability
- Design improvements (VFD's, FO, auxiliary power if needed) – FUTURE SCOPE

SCHEDULE

In general, the following schedule is anticipated from notice to proceed (NTP):

Task 1 WELL PERFORMANCE – FIELD TESTING	2 - 4 weeks
Task 2 EVALUATE EXISTING WELLS	4 – 6 weeks
Task 3 SCADA SYSTEM	4 weeks
Task 4 PREPARE TECHNICAL REPORT	10 - 12 weeks

FEE SCHEDULE

We will provide these services in accordance with our Continuing Services Contract Agreement for Professional Services dated November 15, 2011, with Indian River County.

The Consultant will provide professional services for Task 1 through Task 4 on a lump sum fee basis as follows:

Task No.	Task	Task Fee
TASK 1	WELL PERFORMANCE - FIELD TESTING	$ 19,298
TASK 2	EVALUATE EXISTING WELLS and CONDUCT ASSESSMENT	$ 27,887
TASK 3	SCADA SYSTEM and FIBER SYSTEM EVALUATION - WELLS	$ 25,585
TASK 4	PREPARE TECHNICAL REPORT	$ 15,183
	TOTAL	$ 87,953

ADDITIONAL SERVICES

The following services are not included in the Scope of Services for this project, but may be required depending on circumstances that may arise during the execution of this project. Additional services include, but may not be limited to the following:

- Preparation of design and specification documents

ITEMS FURNISHED BY OWNER

The following items will be furnished by the Owner and are necessary for completion of the tasks described herein.

- Laboratory analysis of raw water quality

EXHIBIT B - FEE SCHEDULE

8-Jan-18

PROJECT: IRCU WELLFIELD ASSESSMENT AND IMPROVEMENTS — SHEET 1 OF 1
CLIENT: Indian River County Utilities — FILE NO.
ESTIMATOR: MDM — DATE: 12/15/17

NO.	TASK	DIRECT LABOR (MAN-HOURS) PRINC	SEN PROF	REG PROF TH/FH	DES/ P2	CLK P1	EXP SUB	Dir Exp	LINE TOTAL	
	EVALUATION, TESTING, AND ASSESSMENT									
1	**WELL PERFORMANCE TESTING**									
	Field Testing/coordination		2	8	16		500	$153	$3,983	
	Prepare Tech Memo		6		12	2		$129	$2,931	
	SUB _ - JLA						$12,384	$0	$12,384	
										$19,298
2	**EXISTING WELL ASSESSMENTS**									
	Kickoff meeting		2	4		4		$66	$1,500	
	1-2 day walkthrough		8	8	16			$215	$4,895	
	Hydraulic modelling		4	4	16	4		$164	$3,728	
	Review motor failures (Hobart)		6	4				$90	$2,040	
	Attend review meetings		6	8	4			$137	$3,107	
	Evalute pump selections, spare parts, aux power		8	8	8			$177	$4,017	
	Evaluate electrical (C&W 66406)						$7,000	$0	$7,000	
	Raw water quality		4		6			$70	$1,600	
										$27,887
3	**SCADA SYSTEM EVALUATION**									
	Review/update fiber optic improvements (CSD)		6	6		4	$5,000	$121	$7,755	
	Individual well improvements		12	4	18	4		$256	$5,830	
	SUB - C&W						$12,000	$0	$12,000	**$25,585**
4	**PREPARE TECH REPORT & DESIGN GUIDES**									
	Meetings		6	6				$104	$2,354	
	Design guidelines		8	12		12		$219	$4,971	
	Summary report		6	18	22	12		$346	$7,858	
										$15,183
	TOTAL HOURS	0	84	90	118	42	$36,884	$2,247	**$87,953**	**$87,953**
	LABOR ($/HOUR)	235	225	150	105	96		$0	$0	
	SUBTOTAL	0	18900	13500	12390	4032	0	$48,822	$0	