

JLA Geosciences, Inc.

HYDROGEOLOGIC CONSULTANTS

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October 26, 2018

via Electronic Mail

Shannon R. LaRocque, P.E.
Utility Director, Village of Wellington
12300 Forest Hill Blvd.
Wellington, FL 33414

RE: *Proposal for Phase II Wellfield Rehabilitation – Hydrogeologic Services*

Dear Shannon:

On November 27, 2017 the Village of Wellington (VOW) issued Florida Design Drilling (FDD) the Notice to Proceed on the rehabilitation of four surficial aquifer wells, Well 18, Well R10, Well R3, and Well 24, as part of the Wellfield Rehabilitation and Maintenance Contract (Bid 017-15/DZ). Change Order No. 1, which eliminated rehabilitation of Well 24 and added rehabilitation of R-8, was issued on April 24. Change Order No. 2, which was issued on September 24, 2018, substituted the rehabilitation of R4, in place of R3. The contract price of \$320,000 and the final completion date for the work, January 12, 2019, remained unchanged.

To date, Well 18 and Well R10 have been rehabilitated and returned to service. Rehabilitation work on Well R8 is almost complete (currently undergoing bacteriological testing for Health Department clearance) and Well R4 remains to be rehabilitated. Rehabilitation efforts have increased the specific capacities of wells R8 and R10 by 37 and 39%, respectively, compared to pre-rehabilitation capacities. The post-rehabilitation specific capacities are approximately 60% and 71% of the original post-construction specific capacities (for R-8 and R-10, respectively).

Several of the Village's production wells (Wells R2, R3, R4, R6, 22, 23, and 24) are constructed with fiberglass-reinforced plastic (FRP) pipe and well screen. The well screens are 0.070-inch (70) slot size and consist of 5-foot sections. The open area of a 12-inch diameter 70-slot continuous wound FRP screen is 109.8 square inches per lineal foot of screen. By comparison, the typical well screen JLA recommends is a stainless steel continuous slot (typically 90-slot, but slot size is based on the gravel available at the time of installation). A 90-slot stainless steel screen has 176 in²/ft of open area, which is 60% more open area than the current screen in the above-mentioned wells. We believe that the existing well design and construction may be limiting the yield of several of the wells. For the most part, the VOW is currently pumping the wells at the design rate; however, there is very little available drawdown while pumping at the design rate. If inefficiencies could be eliminated, the pumping water level would be higher, the well

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would be less stressed, the need for rehabilitation would be less frequent, and power usage associated with a higher head would be lower.

JLA proposes to have FDD perform a video log to determine the productive intervals within the well screen. The video also provides an opportunity to inspect the screen prior to removal. FDD would then pull the existing well screen from Well R-2 (one of the Village's existing FRP wells) and we recommend installing a 12-inch diameter continuous slot stainless steel well screen (80 slot or larger, depending upon the gravel available at the time) installing gravel pack, and developing. If the approach is successful at increasing the specific capacity and available drawdown, the rehabilitation procedure could be completed on additional wells. Based upon the current overall budget of \$440,000 for rehabilitation and oversight during fiscal year 2019, two wells could be rehabilitated using the above-mentioned more comprehensive approach of screen replacement and one well could be rehabilitated using acidization and development. A couple of the R-wells below the powerlines are candidates for acidization and redevelopment, including R-7 and R-9, which had low pumping water levels earlier this year when water quality samples were collected for the membrane water quality characterization.

The following tasks identify our proposed scope of work with the associated costs for your consideration.

- 1.0 **Project Management, Coordination, and Design of Individual Well Rehabilitation Plan** – JLA will assist in the design of a rehabilitation program for each surficial aquifer production well. This task will include coordination with the Village's current well rehabilitation contractor (Florida Design Drilling), coordination with the Village of Wellington and Wellington Water Treatment Plant staff, pre-rehabilitation walkthrough meeting, weekly project updates (via email), monthly project progress meetings, review of Contractor submittals, and review and approval of Contractor pay applications.

Per well unit cost	\$3,653.00
Professional and support services for 3 Wells	\$ 10,959.00

- 2.0 **Surficial Aquifer Well Rehabilitation Services for Three (3) Wells**—Well rehabilitation oversight to include pre-rehabilitation specific capacity testing, supervision of well video logging, supervision during screen pull and screen and gravel installation (if applicable), acidization plan review and field oversight (if applicable), and performance of development testing and specific capacity testing.

Per well cost unit cost	\$12,380.00
Professional and support services for 3 Wells	\$37,140.00

- 3.0 **Technical Memorandum** - provide a brief technical memorandum for each well documenting the rehabilitation program and summarizing the rehabilitation results.

Per well task cost	\$2,396.00
Professional and support services for 3 Wells	\$7,188.00

TOTAL COST ESTIMATE

\$ 55,287.00

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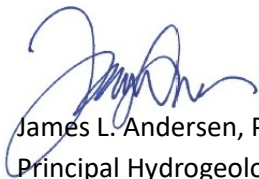
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This proposal was prepared based on the information provided to date and our understanding of the project. If you feel that we have omitted anything or have not clearly defined the anticipated scope of work, we will gladly review additional information, and modify the scope and associated costs accordingly.

We appreciate the opportunity to continue working with you on this important project. If you have any questions please don't hesitate to call me.

Sincerely,

JLA Geosciences, Inc.

A handwritten signature in blue ink, appearing to read 'James L. Andersen', is positioned above the printed name.

James L. Andersen, P.G

Principal Hydrogeologist

Encls.: JLA Hydrogeo Svs Est.

DESCRIPTION:		MAN HOURS/EXPENSES											
Coordinate with FDD and VOW, aid in development of a rehabilitation plan for rehabilitation of 3 wells; coordinate monthly progress meetings and provide monthly look ahead; review contractor submittals; review and approve contractor pay applications; provide contractor coordination, perform pre- and post-rehabilitation specific capacity testing, supervise individual well video logging, review video log, provide onsite hydrogeologic observation during well video logging, screen pull, screen and gravel or liner installation, perform development testing and specific capacity testing; summarize results in brief technical memorandum.		Prin Hydro	Prof. Geol	Snr. Hydro II	Snr. Hydro I	Geol./ Hydro II	Geol./ Hydro I	Geol Tech	Admin	Mileage (\$0.545/mi)	Equipment ODC	PER WELL TOTAL	TASK TOTAL
No.	TASK												
1.0	Project Management, Coordination and Design of Individual Rehabilitation Plan												
	Coordinate with FDD, WTP staff to design rehabilitation plan; Pre-rehabilitation walk-through; Monthly progress meetings with FDD and WTP staff; Weekly progress reports; Review contractor submittals; Review and approve contractor's application for payment												
	Subtotal Task 1.0 (Per Well)	4	15			6						\$3,653	
	Subtotal Task 1.0 (Three Wells)	12	45			18							\$10,959
2.0	Well Rehabilitation Oversight												
	Perform pre-rehabilitation capacity testing, supervise individual well video logging, review video log; provide onsite hydrogeologic observation during screen and gravel installation or liner installation, well video logging, perform step-drawdown testing, perform development testing.												
	Subtotal Task 2.0 (Per Well)	2	8			100						\$12,380	
	Subtotal Task 2.0 (Three Wells)	6	24			300							\$37,140
3.0	Technical Memorandum												
	Technical memorandum summarizing rehabilitation procedures and results												
	Subtotal Task 3.0 (Per Well)	1	6			12						\$2,396	
	Subtotal Task 3.0 (Three Wells)	3	18			36							\$7,188
	TOTAL HOURS	21	87			354							
	LABOR (\$/HOUR)	170	155	140	124	108	93	77	62				
	TOTALS	3570	13485			38232						18,429.00	55,287.00