

CASE STUDY

WATER WELL SERVICES

VILLAGE OF ROMEORVILLE, IL



Project Summary

Customer:

Village of Romeoville, IL

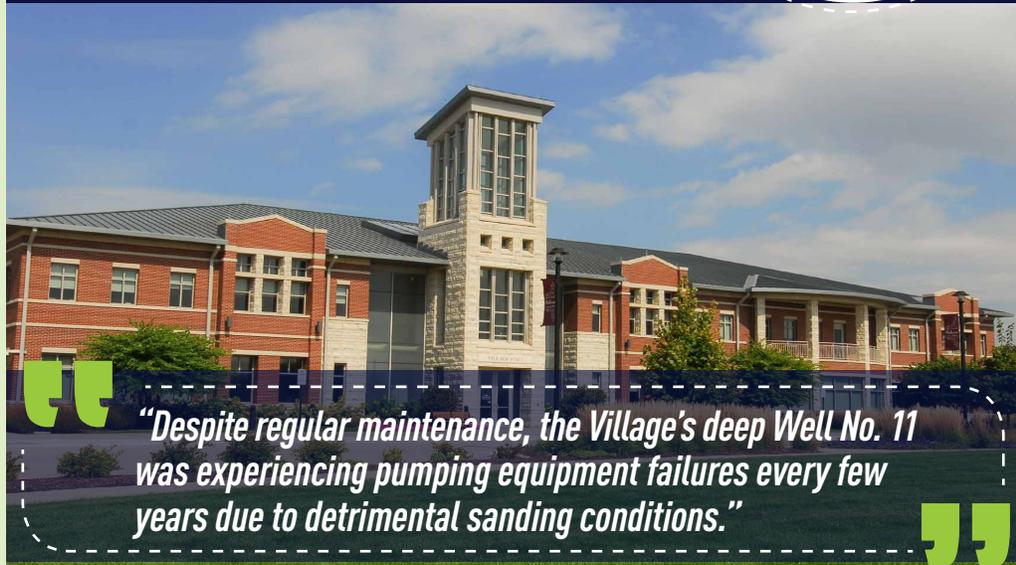
Type of Project:

Developing and implementing a long-lasting, multi-tier innovative solution to solve on-going sanding conditions plaguing a deep water well.

Date: 2017

Results:

- Custom-engineered solution including new abrasion-resistant Centrilift pump with 255ft. of Aquastream® sand separator and a custom fabricated stainless-steel motor eliminated sanding condition in deep well. No sand is currently present in well even at startup.
- Production was successfully restored in a short time period. Well is now pumping at 700gpm at an 858ft pumping level.
- The use of proven metallurgies like the Ni-resist abrasive resistance technology ensure the long-term protection of the well.



Located 26 miles southwest of Chicago, the Village of Romeoville is a thriving community of 50,000 inhabitants. With two local colleges, Lewis University and Joliet Junior Community College, and more than 600 local businesses the Village of Romeoville has experienced a significant economic growth, adding more than 1500 jobs and over one million square feet of new commercial development since 2012. Over the past 10 years the Village has also made significant investments in its public infrastructure including \$25M in water system improvements and \$30M for the expansion of its wastewater treatment plant (6.0 MGD to 7.5 MGD).

The Village of Romeoville draws its groundwater supply from 5 deep wells (pumping water from 1,000 ft. below the surface) and 7 shallow wells (pumping from 80 ft. below the surface) located throughout the Village. Once the raw water is pumped, chlorine is added for disinfection. This treated water is then transported to various storage tanks throughout the Village. Through a maze of mains, the water is then pumped to all areas of the Village as well as portions of unincorporated Plainfield and Bolingbrook neighboring communities. The Village monitors tank levels, pressure, and flow in real-time through a centralized SCADA (Supervisory Control and Data Acquisition) system.

Water Well Solutions Inc., a full-service water wells contractor now part of the SUEZ group, has serviced the wells from Village of Romeoville for several years. Despite the regular maintenance, Well No. 11 kept experiencing pumping equipment failure every few years due to detrimental sanding conditions. In 2017, while conducting routine water samples on Well No. 11, the system operator found fragments of brass in the water. After discussions with the village, it was decided to pull the pumping equipment prior to experiencing a catastrophic failure. Once pulled, Water Well Solutions conducted a thorough condition assessment on both the well and the pumping equipment to come up with a long-lasting solution.



"A Custom-engineered solution including a new Centrilift pump, along with 255ft. of Aquastream® sand separator and a custom fabricated stainless steel motor successfully eliminated sanding conditions"



Once the pumping equipment was pulled, Water Well Solutions conducted an investigational downhole television survey of Well No 11. The TV survey revealed that the well had been previously blasted with bulk blasts of dynamite and that sand was flowing into the well at 1426 ft. Blasting can defragment sandstone causing it to become unstable which leads to sanding conditions which can continue to plague the well for years. The Byron Jackson bowl assembly of Well No. 11 was also disassembled and inspected. It showed significant amount of wear in the rotating assembly most likely from sand wear. The wear rings installed in the bowl assembly during the previous service, were almost completely worn away. In addition, due to wear characteristics, it was apparent that there would have been significant vibration in the bowl assembly which likely would have been transmitted to the motor.

Several approaches were then discussed in collaboration with the Village water operators to prolong the lifespan of the pumping equipment. While pumping with a 300Hp pumping equipment, the sanding condition generally occurred only upon startup when higher entrance velocities were created in the well. Therefore, the solution that looked most promising and was agreed upon was to downsize the pumping equipment and increase the run time. Downsizing the

pumping equipment from 800gpm to 700gpm reduced the likelihood of high entrance velocities and turbulent flows to occur upon startup. Downsizing the well production also reduced the likelihood of sand being pulled in, as experienced with higher flow rates. Once the flow rate stabilized, the sanding condition decreased proportionally as entrance velocities decreased. Well No 11 has experienced a significant reduction in sand pumping while pumping consistently at a flow rate of ~700gpm.

An abrasion resistant Centrilift pump with a Ni-Resist package was installed and coupled with an Aquastream® sand separator for added protection. The Centrilift pump, constructed of Nickel Aluminum Bronze, is designed to operate in harsh sanding conditions. For better results, the pump was upgraded to premium construction with the Abrasion Resistance technology Ni-Resist that includes tungsten carbide bearings and sleeves between every stage, or a 1:1 ratio. This is one of the hardest metallurgies known and protects the hub of the stage from being attacked by the sand. Tests show an 8X increase in run life with this protection alone in sand producing wells. Once the pump was installed, flow tests conducted upon startup showed that very little to no sand was present in Well No 11. The pump is also producing significantly better than anticipated.



During the repairs to Well No. 11, Water Well Solutions field technicians also took an in-depth look at the pipe threads. The inspection involved cleaning the pipe threads of grease and debris to view the condition of the threads. The pipe sections were not in terrible shape but a lot of erosion was discovered and subsequently addressed in the middle of the threads where there is no thread engagement. A final chemical rehabilitation of Well No 11 was performed before placing it back into service on June 2017. The well is currently producing 700gpm at an 858ft. pumping level.

The design and implementation of this creative solution was possible thanks to a close collaboration between SUEZ/Water Well Solutions groundwater experts and the water operators of Village of Romeoville. As Carl Groth, Water Superintendent of Village of Romeoville explains: *"I am not always an easy person to convince when attempting these unique and costly projects. However, because of the knowledge base and experience of Water Well Solution's experts and their willingness to be fully transparent and work directly with our operators, we were very comfortable with our decisions". "One of my greatest concerns with any project is the quality of the parts and the quality of the service. SUEZ/Water Well Solutions team gets an "A" for both"* concludes Mr. Groth.

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