

# Pumping system with integrated intelligence eliminates chronic clogging and debris buildup in pump station

Design-build project provides cost-effective solution for the long term

While the city of Sublimity, Oregon, relies on a nearby municipality for wastewater treatment, the city utilizes its own sewer collection system. Built in 1975, portions of the system now have exceeded their expected lifespan, and had become inefficient with growing maintenance needs. Additionally, since the construction of this collection system, the population of Sublimity has grown to about 3,000 residents. The city's population is expected to grow well into the future, with the addition of three new 100-parcel sub-developments now approved.

The existing sewer collection system included a failing pump station. The technology had become obsolete and inefficient, and the city's continued residential growth over the last five decades meant a rapid increase in both pump run times and household non-dispersibles. These two factors resulted in increased wear, increased maintenance costs, and more labor intensive maintenance tasks.

The city of Sublimity sought a solution that would help eliminate the clogging issues and increase the efficiency of the pump station, allowing the staff to be more productive with their time, reducing maintenance costs, and leading to power savings.

## The Challenge

The existing lift station relied on a failing duplex pump station with 15 and 20 horsepower (hp) vortex pumps. Over time, increased residential development served by this pump station resulted in an increased volume of flushables, also known as modern trash, and a significant increase in daily pump run times.

Due to these factors, the pumps began to clog on a regular basis, resulting in a significant increase in onsite labor costs. Each incident required a two-man crew to remove the clog and reset the equipment. Due to the tedious nature and limited maintenance accessibility of the pumps and the wet well, the two-man crew would spend four hours to remove the clog and place the pumps back into service. That was a whole man-day of productivity lost. This was especially troublesome for Sublimity's Public Works Department as it is in charge of the water distribution system, the maintenance of the two city parks, streets, and city hall upkeep in addition to the sewer pump stations. In total, this single pump station was costing Sublimity \$3,360 in annual labor costs alone. In addition to the labor costs,



The compact Concertor XPC control panel with intuitive touchscreen controls.

**CUSTOMER:** Sublimity, Oregon

**CHALLENGE:** Obsolete equipment leading to frequent clogs and expensive maintenance.

**XYLEM SOLUTION:** Concertor XPC integrating advanced controls for a complete pumping solution that eliminated clogs and reduced maintenance.

Benefit	Impact	
Reduced labor and maintenance costs	Saved \$11,300 per year	
Decreased capital cost with design-build procurement	Saved nearly \$50,000	
Eliminated chronic pump clogging	Zero clogs since installation of Concertor XPC	
Allowed Sublimity DPW to be more productive with their time	Saved one entire man-day per month for the team to focus on other needs	



The Concertor XPC performing a wet well cleaning cycle to remove any debris from the pump station.



Concertor XPC pump station fully installed, complete with TOPS insert and new controls building.

the buildup of rags over time required Sublimity to contract quarterly with a vacuum truck. The vacuum truck cleans the debris and rags out of the pump station and cost Sublimity an additional \$8,000 per year.

The Sublimity DPW team realized that they had a two-fold challenge on their hands: address the time-consuming nature and inefficiencies of a failing pump system and improve capacity to address the current and future needs of a growing residential area.

### **The Xylem Solution**

Like many municipalities nationwide, the city of Sublimity DPW works under tight budget constraints. To resolve this issue, DPW leadership worked directly with Xylem representatives to engineer a complete design-build (DB) solution with full technical support. DB project delivery methods allow the Owner more input into the design and equipment selection. DB also reduces the overall project schedule, which gets the Owner to the end result faster. And with that time saved, the DB process can create a lower overall price tag for the project. Direct procurement saved Sublimity nearly \$50,000 and allowed the city to work directly with Xylem experts during the entire process. Xylem was also able to engineer and provide a temporary bypass system, using Xylem's Godwin pumps, to avoid any service interruptions during the process.

Xylem's application engineer team designed a solution using Concertor XPC pumps, a controls building, TOPS (the optimum pump station) insert and new valve vault. The centerpiece of the design was the introduction of the Concertor XPC pumps, which integrate the advanced controls of a traditional pump controller into the traditional mechanical pump for a state-of-the-art intelligent pumping system. This system intelligence is accessible via a touchscreen device and is available for SCADA connectivity, allowing operations and maintenance staff to review both real-time performance and historical performance, complete with trending analysis.

Concertor XPC pumps sense the operating conditions of the environment and adapt performance in real time. When debris of any kind is present, the Concertor XPC pumps are able to self-adjust the impeller, allowing larger objects to simply pass through. For tougher solids, the system automatically stops pumping and initiates a self-cleaning sequence, which repeatedly changes the rotation direction with high torque until the debris passes. This advanced technology helps sustain high-operating efficiencies during peak times without backups or clogs. In turn, this reduces costly and time-consuming service calls.

The design of the Concertor XPC pump, along with the Flygt Adaptive N Impeller and the built-in pump reversing program, efficiently self-adapts to reduce standard debris issues, such as those created by non-dispersibles, sand, sludge and other debris. This high operational flexibility was key in addressing the station's ongoing issues with clogs due to flow and modern trash.

Additionally, integration of this state-of-the-art equipment also allowed the lift station to decrease the amount of energy required to power the pumps. The Concertor XPC has the unique capability to operate under several different pump curves, exceeding the traditional mindset of what

a 10 hp pump can accomplish. Replacing the aging 15 and 20 hp pumps with 10 hp Concertor XPC pumps decreased the overall installed power. Furthermore, the improved pumping performance of the Concertor XPC has the pump station at Sublimity delivering the same duty point at only 3.5 hp, saving the community a considerable amount of energy.

## Results

Completing the upgrade to the existing lift station has provided numerous, immediate benefits in operating costs, efficiencies and the reduction of additional maintenance costs. The lift station has experienced no clogs since the Concertor XPC pumps were placed into use, compared to monthly clogs and maintenance requirements with the traditional pumping system.

The efficiencies provided by the Concertor XPC pumps are allowing Sublimity to operate the pumps at 3.5 hp with improved results, leaving 6.5 hp untapped until needed. In future years, when new homes are added to the area, DPW staff will be able to tap into the additional installed capacity to address future needs without expensive upgrades or retrofits.

The Concertor XPC pumps have reduced the daily run time of the pump station to between 30 and 45 minutes, compared to two to three hours with the previous vortex pumps. Additionally, operators are now able to perform routine maintenance and monitor operations in real time safely from the controls building, regardless of the weather.

Fine tuning operations is easy and efficient with the Concertor XPC software platform. With its integrated intelligence, the controls cabinet for the Concertor XPC is only 1/3 of the size as the previous panel and very easy to install. This resulted in secondary savings, as an electrician was only required to be on site for about a half day, compared to the average three- to five-day span, and the cost of the controls building was reduced because it didn't need to be as large. According to Alan Frost, public works director for the city of Sublimity, the new system has been a significant improvement for the municipality. "The Concertor XPC touchscreen is the best controls we have ever had. It is very intuitive and easy to navigate," he reports.

## Conclusion

Once the Concertor XPC upgrade was complete and fully commissioned, the Sublimity DPW saw immediate improvement in efficiencies, cost reductions and improved operations for the existing lift station. By partnering with Xylem on a design-build solution, the city of Sublimity was able to procure all the equipment that provided them the best value and did so on a shorter timeline and for less overall cost. These upgrades not only provided an immediate solution to an ongoing, chronic and costly problem for the Sublimity DPW, but will also provide years of service as the city's population continues to grow.



Godwin dewatering pumps ensuring continuity of operations during the installation of the new Concertor XPC pump station.

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# Xylem ['zīləm]

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

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