



Advanced Communications for Automation Keeps Vineyard Irrigation Systems Flowing

The Customer

SeVein Water Association owns and manages the water delivery system and infrastructure for 2,700 acres of vineyards in Walla Walla Valley — some of the most technologically advanced properties in Oregon State. Tapping more than 1,000 feet below the surface, the association constructed one of the finest agricultural water delivery systems in the Northwest. SeVein owns, operates, and maintains the wells, pumps, and motors and is responsible for the delivery of water to each owner's property line.

Of the 2,700 vineyard acres served, there are 1,000 currently sold or under development. Vineyard property is available in blocks of 40 acres or larger, with each parcel including water rights. The company's cornerstone property is Seven Hills Vineyards, which is one of the oldest and most prestigious vineyards in the valley. For more than three decades, the property has been graced with vineyards that produce some of the finest wines in the world.

The Challenge

The primary responsibility of SeVein Water Association is to ensure the adequate supply and distribution of water across the nearly 3,000 acre vineyard project. The goal is to supply approximately 5 GPM per irrigated acre to each site at any given time. The large distances and dramatic elevation changes across each parcel complicates matters: the SeVein Water Association estimates approximately 740 feet of total elevation change between its highest and lowest properties. To make matters more difficult, there was no electrical infrastructure in place to monitor water flow at each property.

Water flow management is a 24/7 job because it is critical to the superior quality of each vineyard. Well management is particularly important, ensuring that all levels, flows, flow totals, and pressures are measured accurately and data logged to determine trending. The ability to incorporate a series of alerts and alarms is also important, in order to monitor data and warn of any potential issues via cell phone, text messaging and email.

"Water flow is the lifeblood of our business. Any miscalculation in delivery can cause a crucial drop in quality for the years vintage. Making matters worse, we aren't dealing with the most favorable terrain – with delivery required to take place across long distances. To be successful, we needed a centralized monitoring and communication infrastructure to ensure the water gets to where it needs to be," said Larry Wondra, Manager of Seven Hills Properties Water Association DBA SeVein Water Association.

Operational Impact & Benefits

- The water supply and distribution system is controlled from a centrally-located SCADA PC.
- The SCADA PC can be operated from any PC, tablet, or smartphone using remote desktop or from any location over the Internet using a VPN connection and remote desktop.
- A Web Server residing on the SCADA PC allows any PC, tablet, or smartphone to monitor the system from anywhere over the Internet.



Organization:

Located on the southern border of the Walla Walla Valley AVA in Oregon State, SeVein's cornerstone property, Seven Hills Vineyard, is one of the oldest and most prestigious vineyards in the region. It has been a key vineyard of each founding partner's own winery for more than 25 years.

Industry:

Irrigation

Solution:

KEPServerEX® is the interface to all the field irrigation systems, monitoring three wells and five bulges via radio communications to a centralized SCADA system for dynamic control and monitoring.

The Approach

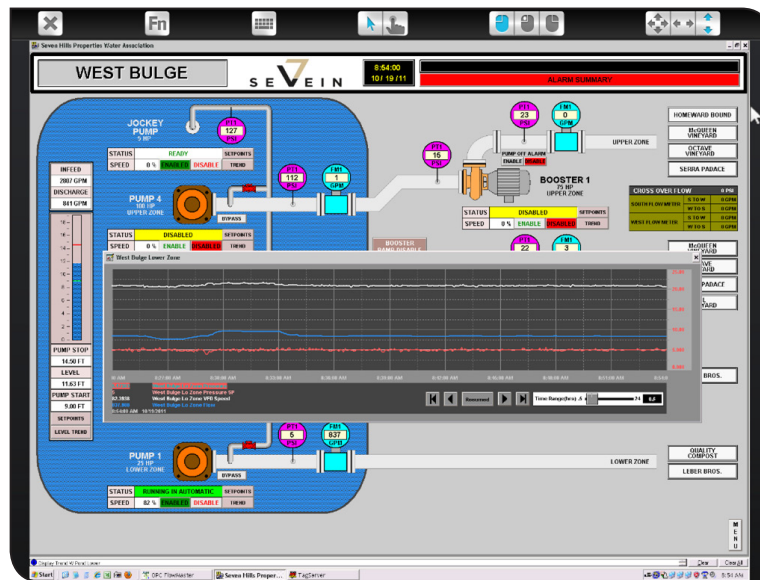
SeVein teamed with a variety of vendors to develop a highly intricate and automated management and communications infrastructure. At the initial stage, Programmable Logic Controllers (PLC) from Siemens were chosen for all control panels throughout the project. The SIMATIC PLC handles control tasks, data integration, and archiving. Due to the remote location of many wells and pump stations, the team chose to install wireless capacity on each control panel that all connects back to a centrally-located SCADA PC. It was also decided that Classic OPC Data Access (OPC DA) would be the preferred communications standard.

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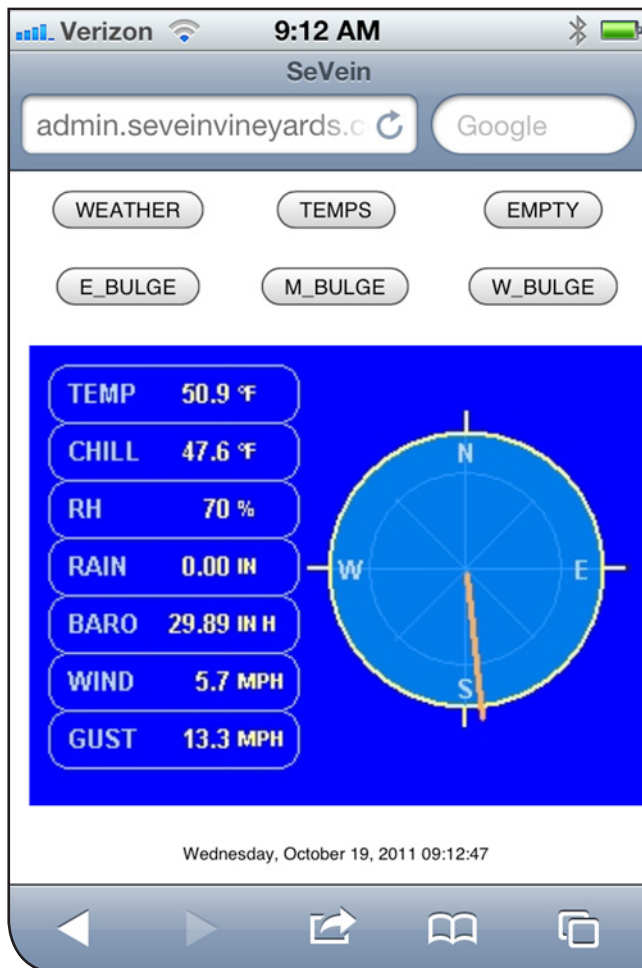
Based on this standard, SeVein opted to work with Kepware Technologies to build an intricate communications infrastructure. Kepware's KEPServerEX® is specifically engineered to connect disparate devices and applications, from plant control systems to enterprise information systems. The flexible and scalable software can easily manage, monitor, and control diverse automation devices and software applications. Communications are managed through a robust platform that supports an array of open standards and Third-Party APIs.



SeVein Water Association
SCADA System Bulge

"For SeVein Water, the ability to bring together disparate devices into one communications system for irrigation management is critical. After exploring many options, the team felt that only Kepware was able to provide the single, scalable communications platform necessary to address the delicate balancing act of water supply and demand," continued Wondra.

To solve power challenges, the team chose to rely on solar energy. They installed a secondary wireless network to effectively connect solar-powered flow meter sites at each property. Each flow meter was then connected back to the core SCADA PC, thus enabling water usage to be closely monitored. Because water flow has the potential to immediately expand and contract, SeVein also chose Variable Frequency Drive (VFD) pump systems to enable varying amounts of water to be pumped when needed. To increase the value of communications, the project also included a centrally-located station to monitor all current weather patterns. This station continuously sends weather data to the Weather Underground website for member and public access. The system directly communicates with the SCADA PC via the OPC server.



FAST FACTS

Kepware helps SCADA System Control Everything:

- 3 Wells.
- 5 Bulges.
- 4 Booster Stations.
- 16 Irrigation Distribution Zones.
- 37 Pumps, each with Variable Speed Drive ranging from 2 HP to 800 HP.
- 3,494 Total HP.
- 41 Flow Meters: 9 Bulge Supply, 19 Bulge Distribution, and 13 Client Distribution.
- 8 Motor-operated valves to control water supply from 3 Wells to 5 Bulges.

The Benefits

SeVein's irrigation infrastructure is now a model for the industry, consisting of three deep basalt wells interconnected with five bulges and more than ten miles of buried mainline. It has a capacity of 11,000 gallons per minute and a redundant capacity to the water right of 7,500 GPM. State-of-the-art telemetry-controlled variable frequency speed pumps, booster pumps, and motors are designed to deliver 5 GPM per irrigated acre to each property.

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Kepware functions as the "glue" that binds the systems together. The software not only increases the communications' reliability, but also provides SeVein with deeper insight into the irrigation monitoring and control data. Furthermore, significantly streamlining the delivery of data also creates a major reduction in operational costs. The automation enables the customer to make more efficient use of time, thus allowing for more effective task prioritization.

"With the help of Kepware, I can see everything that is going on: pressures, flows, and trends. When I do have a problem, I can go back to the data and view the trends to see what caused the problem. Without this data, I don't know it's a problem until — it's a critical problem. In addition, I can monitor and control systems from my iPad. With a few clicks, I'm online and can shut problem areas down. It would be very difficult to stay on top of everything without the Kepware supplied data," Wondra concluded.

About Kepware Technologies

Kepware Technologies, established in 1995, develops a wide range of communication and interoperability software solutions for the Automation industry. Our flexible and scalable solutions are for connecting, managing, monitoring, and controlling diverse automation devices and software applications. Our industry-endorsed software solutions improve operations and decision-making throughout all levels of an organization. Kepware Technologies' mission is to be "Your Standard for Connectivity."

