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Increased Pressure Removes “Pressure” for Regional Sewer Authority

Case Study #308



Founded in 1925, the Western Carolina Regional Sewer Authority (WCRSA) is a special purpose district of South Carolina, located in northwestern South Carolina. The organization serves over 400,000 customers in Greenville County and parts of Anderson, Spartanburg, and Laurens Counties, covering a total of 296 square miles. WCRSA maintains 300 miles of major sewer trunk lines and conducts operations through nine major wastewater treatment facilities located on three river basins; the Enoree, Reedy, and Saluda rivers.

For more than eight decades, WCRSA has been committed to protecting the public health and providing the necessary infrastructure to support economic growth in the state, despite the tightening of state and federal environmental regulations. Celebrating 80 years of environmental stewardship, WCRSA's goals are to be a world-class organization and to have zero violations all while being dedicated to enhancing the quality of life in its service area by providing high quality wastewater treatment services.

But due to a population surge over the last 15-20 years - and to the age of one of the area's oldest pump stations, WCRSA was challenged with the task of rebuilding the Tubbs Mountain Road #1 pump station. Originally installed in the 1960's, this particular pump station was operating at its maximum duty cycle and exhibiting telltale signs of aging.

However, just prior to launching an overhaul for the pump station, WCRSA completed its participation in the EPA's CMOM Program, whereby the Tubbs Mountain #1 site was identified as one of WCRSA's top five repeat SSO (Sewer System Overflow) sites. As a result, WCRSA made a commitment to correct the problems associated with this SSO site within a two-year period – while maintaining operation of the site during the construction and rebuilding process, so as to minimize the community's discomfort. “This process is very difficult – and can be very expensive,” attests Tony Walton, Collection System Manager for Western Carolina Regional Sewer Authority.

“The one thing that makes this project specifically difficult is space,” shares Trent Bowles, Pump Station Supervisor with the Western Carolina Regional Sewer Authority. “We're in a developed area, so we have a very small footprint that we have to work within. Currently, the site is very compact, but the redesign is putting even tighter restrictions on space. It's a challenge.”

Rebuilding Around State-of-the-Art

Rogers and Callcott, the planning firm charged with addressing the WCRSA challenge, originally drafted the new pump station design to incorporate two 7' x 10' Gorman-Rupp pump stations working within a larger footprint. However, as a new and smaller footprint was mandated, creativity was required to uncover new solutions.

According to Rogers & Callcott, the Tubbs Mountain Road #1 pump station is also capacity limited by the facilities that receive its discharge. Therefore, the decision was made to reroute the force main to a remote destination, approximately two (2) miles away – whereby WCRSA could discharge into a large gravity trunk sewer that would have no pumping facilities on it, rather than building a force main to its original discharge point. “The day that decision was made was a big day in western South Carolina. This new pump station, with the new design, has removed a load from a regional pump station - and that is an additional benefit to the Sewer Authority,” shares Bowen.



Proceeding with the plan, the team determined the yield and the delivery conditions that would be needed to achieve their desired result. Because of the area served by the pumps, the station took into account a yield of 800 gallons per minute to achieve a total dynamic head of 160 feet. A conventional, single pump was incapable of delivering this type of volume and pressure. The plan was drafted to incorporate two T-series pumps, operating in a series, one right behind the other, in order to obtain the required head.

However, midstream, Rogers & Callcott became aware of new pumping technology that could further maximize the new station's efficiency and performance overall – up to 30% more capacity in fact than what the team was previously hoping to experience.

“Regarding efficiency, by using the new Gorman-Rupp Ultra V pump technology, we're now able to use a lot more of the horsepower for future capacity too - versus the previous design, which was really at the top of the 40-horsepower curve,” adds Barry Harms, P.E., of TenCarVa, the manufacturer's representative that serves WCRSA. “That also cuts down on our size requirements for the onsite generator.”

Being able to reduce the required footprint for WCRSA, while also freeing up space to allow for equipment to be better positioned for safer, more comfortable routine maintenance in the future – to clean the wet wells and things of that nature – was also key in the decision making process.

“To integrate the new technology required a quick redirect and redesign, but we went to work, modifying drawings to accommodate the change in technology,” recalls Walton. “We felt as if the benefits of the site, the savings of this compact configuration – and the fact that these pumps are really more suitable for what we were trying to do - made it all worthwhile.”

The first pump of its kind in South Carolina, WCRSA concurs with the decision to use the new Ultra V. “We aren't able to fully utilize the Ultra V initially for what it's designed to accomplish at peak performance. However, it will give us more room, allowing us to get our equipment in and perform the work that we will have to perform to keep this station functioning for the next 20 to 30 to 40 years. That's a lot of return on investment,” adds Walton.

Concerns Alleviated

“We never really had any concerns about the technology being new, because of the reputation that Gorman-Rupp has, and because of the past experiences we’ve had in working with their pumps,” shares Bowles. Rogers and Callcott concurred with the recommendation. “The advantages that this new technology has over older technology made it well worth any associated risks,” concurs Bowen. “We trust that any product put on the market by this company has been pretty well tested. If Gorman-Rupp is confident with the technology, so are we.”

“As the manufacturer’s representative, when we’re introducing a new product that the industry has been needing and asking for, a high head, high-efficiency pump, there’s always a bit of anxiety because it’s revolutionary” adds Harms. “But this technology has been in design for nearly two decades, and has had over 3,000 tests. We believe in it.”

Data, Data, Data

A custom level controller has also been adopted for this new application, integrating air-release valve technology into the solution. “What we like to do with customers is attempt to custom fit the pump station technology with individual organizational needs,” shares Harms.

In this case, WCRSA utilizes a level control system into the pump’s control panel. For communication requirements for that data, WCRSA relies on a RACO dialer, which is also used on all WCRSA pump stations for data monitoring.

“We also have an internal polling system,” adds Walton. “We’re presently using land lines at all our facilities – and poll those stations twice per hour to ensure communications. If we don’t get a signal, then we know we’re experiencing a disruption in the system – and someone is instantly dispatched to the site to rectify the failure.”

To WCRSA, the ability to monitor the pump stations is extremely important – allowing the engineering team instead to focus their time and attention on other items such as repairs and line work associated with the pump stations as well as the authority’s collection system. With the new system, the authority can now diagnose problems whenever they occur – simply by using gauge readings. To ready staff and personnel for this constant flow of information, all WCRSA personnel are exposed to ongoing, authority-sponsored training courses. “In these programs, our personnel are taught the basics of centrifugal pumps, operation and maintenance, safety and trouble shooting, so that problems can be diagnosed before they become acute,” shares Harms.

With maintenance a clear priority to WCRSA, the Pump Station Crew is staffed with seven members, including a certified electrician and mechanic for each team. These teams are solely responsible for the inspection, operation, and repair of approximately 21 pump stations on each of the three routes.





Spare Parts

The decision to install the new Ultra V self-priming, centrifugal pump was also a cost effective decision for the sewer authority. “Due to the inventory of parts available to us within a 24-hour period, any problem that could arise could be quickly rectified with our own staff and simple maintenance in the field,” adds Walton.

In all, the authority is responsible for nine different pump manufacturers throughout their comprehensive collection system. “Out of our 63 pump stations, over 50% of the stations are Gorman-Rupp stations. By having that amount of experience with the Gorman-Rupp pumps and pump stations, we benefit from our familiarity with the technology and the company, and trouble-shooting and service are easier.”

To further ensure that repairs are streamlined, WCRSA maintains an inventory of critical spare parts – in the event that a pump does have difficulty, and to support their internal ability to rebuild all of their pumps. The authority also values the ability to use one universal rotating assembly and other spare parts for all like-series pumps being used within the system.

“We do have spare parts for the other manufacturers in the system, but by having a large number of Gorman-Rupp lift stations within our system, it’s just more cost-effective to be able to maintain a streamlined spare parts inventory,” offers Walton. “I’ve had downtimes upwards of 13-14 weeks waiting on parts for other pump brands. If it’s the wrong time of year ... you start sweating bullets.”

About The Gorman-Rupp Company

Gorman-Rupp is the leading manufacturer of pumps and pumping systems for the municipal, water, wastewater, sewage, industrial, construction, petroleum, fire and OEM markets. Pumps include self-priming centrifugal, centrifugal, submersible, trash, priming assist, rotary gear and air-driven diaphragm pumps. In addition, Gorman-Rupp manufactures a complete line of packaged lift stations and booster stations, which include pumps, motors, controls, piping, accessories and enclosures. The company prides itself on manufacturing and delivering the right pump for the job.