

Reynolds Gets Clean Water Upgrade



**New Wastewater System
Positions Town for the Future**

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The challenges of getting water and wastewater services into high poverty areas can seem overwhelming—especially when it comes to funding. But when a town is motivated to make it happen, not much can stop them. Such was the case with Reynolds, a small Georgia community located about halfway between Columbus and Macon.

Reynolds is a place where everyone knows each other. It has one main street, and plenty of locally owned shops. Every year, the town's residents put out the welcome mat to host the state's Strawberry Festival. Visitors from all across Georgia come to Reynolds for its foods, crafts, music, and luscious strawberries.

Reynolds has a population of a little more than one thousand people. Nearly 24 percent of its population is at or below poverty level. With such low incomes in the town, coming up with enough money to build a traditional wastewater treatment system wasn't going to happen. So the town had to pull together.

Old System Cannot be Fixed

The old wastewater system was beyond upgrades. According to U.S. Department of Agriculture's (USDA) Rural Development (RD) documents, Reynolds sanitary sewer system was installed in 1951. The town made some additions in 1972. The system consisted of almost entirely of terracotta pipe and brick manholes. It had an outdated oxidation pond that was only permitted for 160,000 gallons per day. Then in 2007, the Georgia Environmental Protection Division found that effluent limitations were in violation of U.S. Environmental Protection Agency National Pollution Discharge Elimination System (NPDES) limits. The town had to do something to improve its sewer system. Public health was on the line.

Jack Stanek, Georgia USDA RD coordinator, says that the town had started to get into trouble with the state's environmental protection division. The old system couldn't treat the current wastewater load and was putting the town's residents health at risk. They needed help alleviating the health and sanitary issues caused by the failing system. That's when they contacted USDA for help, and the agency's StrikeForce program was able to help. (See sidebar for more about StrikeForce.)



The original City of Reynolds oxidation pond was insufficient for the City's current wastewater treatment needs.



Stanek says, that despite the obstacles, the little town was eager to get a new system, adding that the town's leadership recognized the economic advantages of the system upgrade.

"The town had to have a vision and commitment," he says.

Stanek adds that without those characteristics, projects don't get too far. And fortunately Reynolds' town leaders knew that economic development relied upon having a vision of their future and commitment to make it happen. "Everyone we worked with was ready to get the job done," Stanek says. "This was one of the smoothest jobs I've ever worked on."

Keeping the New System Simple

Getting the town's leadership on the same page to move the upgrade forward was the first step in Reynolds' success. The next step was getting funding in order.

"The loan/grant option was better for us," says Scott Jones, Reynolds public works director. Reynolds received a little more than \$2 million in a loan and a \$3.975 million grant for its project through USDA RD.

To demonstrate that they would be able to repay the loan, they had to raise user rates. Communication with the town's residents was key. "We're a real close-knit community," says Jones. "I see pretty much the same people everyday."



What is Strike Force?

Rural Americans face many unique challenges every day, and the U.S. Department of Agriculture (USDA) provides assistance to help rural communities prosper. Unfortunately, 85 percent of America's persistent poverty counties are in rural America—and we can't allow these areas to be left behind.

USDA's StrikeForce for Rural Growth and Opportunity Initiative works to address the unique set of challenges faced by many of America's rural communities. Through StrikeForce, USDA is leveraging resources and collaborating with partners and stakeholders to improve economic opportunity and quality of life in these areas.

StrikeForce now operates in more than 800 rural counties, parishes, boroughs, tribal reservations, and colonias in 20 states, including Alabama, Alaska, Arkansas, Arizona, Colorado, Georgia, Kentucky, Louisiana, Mississippi, Nevada, New Mexico, North Carolina, North Dakota, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia and West Virginia.

For more information about StrikeForce, check out this fact sheet "StrikeForce for Rural Growth and Opportunity" at <http://www.usda.gov/documents/usda-strikeforce-fact-sheet.pdf>.

This close relationship with town residents meant that Jones had to make sure he was honest with his neighbors. And that meant making sure he let them know what was happening with the project very step of the way, including that to get the project off the ground, they would have to raise user rates.

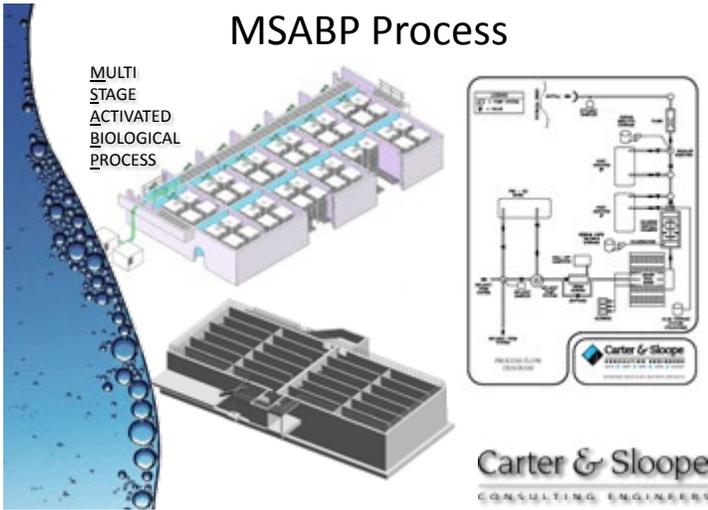
"We started slowly increasing rates over a period of years," he says. Jones explains that this slow increase eased financial burdens for the community because the rate increase did not come a shock. And the town didn't just raise the rates with no explanation. The town's leadership maintained communication with the residents through a variety of methods.

"We put articles in the paper throughout construction," says Jones. He was also prepared to answer the community members' questions. Because the community is so close knit, he says building trust wasn't too difficult. But he believes that knowing what to say was critical in getting support. So he kept up on what was happening with the system's financing and how the new would operate.

What kind of system did they get?

One of the next steps Jones, the town's council, and other leaders did was to determine what kind of system they needed to replace the old one. Not only would the new system need to be cost-effective but it would also need to be simple to operate and maintain.

MSABP Process



The Multi-Stage Activated Sludge Biological Process System

The multi-stage activated sludge biological process system, in Reynolds, Georgia, is classified as a trickling filter. A trickling filter biodegrades organic matter and can also be used to achieve nitrification. (Nitrification is the biological oxidation of ammonia or ammonium to nitrite followed by the oxidation of the nitrite to nitrate.) The wastewater trickles through a circular bed of coarse stones or plastic material. A rotating distributor (a rotating pipe with several holes across it) evenly distributes the wastewater from above the bed. The microorganisms in the wastewater attach themselves to the bed (also known as the filter media), which is covered with bacteria. The bacteria break down the organic waste and remove pollutants from the wastewater.

The advantages of these kinds of filters are that they use less energy, produce less sludge, and require less operator attention.

The system installed in Reynolds is a multi-stage system. It has two parallel flow paths, and each path has 12 stages. Each stage has the same volume, same attached-growth media, and same fine-bubble layout. Initially, the microorganisms use wastewater elements as food. Then through the process the microorganisms set up a food chain in which they become food for microorganisms in the successive stages.

There is a blend of attached and suspended growth in each reactor stage. Attached growth predominates the media fabric that hangs over the 24-bioreactor stages. However, some suspended growth does occur. For example, in the first stage attached growth will have a concentration of 6,000 to 10,000 mg/L and suspended growth will have a concentration of 100 to 150 mg/L. This concentration will reduce from stage to stage. The process does not need additional digesters or biosolids dewatering, and waste sludge is reduced to 30 mg/L in the effluent. This process not only highly treats the wastewater; it means that biosolids (sludge) coming from the biological growth are dramatically reduced.

For more information about this system, visit Carter and Sloope's website at <http://cartersloope.com>. For more information about trickling filters, download a copy of the National Environmental Services Center issue of Pipeline—The Attached Growth Process: Old Technology Takes New Forms at http://www.nesc.wvu.edu/pdf/WW/publications/pipline/PL_WI04.pdf.



A rack for attached growth media is lowered into place.



A close-up of the attached growth media—the media fabric sheets provide a means for the biology to physically attach.





The MSABP finished tankage – both sets of 12 stages are clearly visible.



The finished complex showing the re-aeration ponds (foreground), the new public works building (midground), and the MSABP with drum screen behind.

“I’m the only operator in town, so we wanted something that was easy to run,” says Jones. “It took us about eight years to get to the construction of the system. We looked at a few different treatment systems to determine what would be best for us. And we narrowed it down to this system.”

Based on his research, Jones says the town decided upon the Multi-Stage Activated Sludge Biological Process system. One of the greatest advantages of this system is its simplicity, according to Mark Gatlin, P.E., principal, Carter and Sloope, Inc., the engineering firm that worked on the Reynolds’ project.

Where conventional systems demand constant operator attention, this system allows the operator more freedom. And in Jones’s case, more freedom is paramount because he has so many other duties to which he must attend. Cost was also a concern.

“We can only afford three people in the public works department—including me—so cost was a big issue,” says Jones.

“Our driving commitment in a community the size of Reynolds is to minimize labor and staff needs as far as possible,” says Gatlin. “This system makes operation easier and far less expensive. The total number of moving parts is far less than a mechanical plant. Capital cost is less than a conventional system—not dramatically but it’s still less than less the conventional system.

“Another advantage is the high quality effluent,” he continues. “The microorganisms in latter system stages are actually consuming the biosolids that slough off. They use the carbonate for food. This process is very good for BOD and ammonia but only a minimal amount of phosphorus is removed. So if you have a nutrient issue downstream, you’ll have to put in another process.



“The target market for this type of system is small communities because of its simplicity. It’s small and easy to run,” Gaitlan concludes.

The community also needed an environmental report that described whether the system would alleviate a health and sanitary issue. In Reynolds’ case it did. This allowed the community to receive a lower loan interest rate.

Jones takes his job seriously. So he worked closely with the engineering firm, Carter and Sloop, to understand the system and its environmental impacts. He also worked with Reynolds’ city council to understand the economic development impacts.

“We were able to get a lot out of the project money. Overall it’s made out department and the city better. We are able to have a public works building now. We also got a couple of trucks we needed. And we’re better prepared for the future.

“With this new system we’re attractive for growth and industry, and we’ve been extending new utilities to outside of town.”

Despite the challenges of bringing clean water services to small, high poverty level areas, it can be done. And Reynolds is a shining example. With determined community leaders, funding sources such as USDA RD, and the right technology, towns such as Reynolds can build bright futures.

For more information about USDA RD state office and to find information about loans and grants, go to <http://www.rd.usda.gov/contact-us/state-of-fices>.



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