The Upper Trinity Regional Water District (UTRWD) operates the Riverbend Water Reclamation Plant (WRP), which was a sequencing batch reactor (SBR) plant in Aubrey, Texas. The service area has seen increased growth and experienced extreme rain events, which caused the plant to consistently receive flows and loads that were very close to its rated capacity of 2 mgd average daily flow. Plant operators had to continuously make adjustments based on multiple sample tests to allow the plant to keep up with flow increases. UTRWD staff recognized the need to improve the plant’s treatment approach to make operations and maintenance easier to manage.

In January of 2016, UTRWD began a project to improve operational reliability and increase flow capacity. The goals were to convert the SBR plant to activated sludge, and increase the average daily flow capacity from 2 mgd to 4 mgd within the existing three basins. To carry out this project, UTRWD selected an innovative treatment technology: ballasted activated sludge. To complete the expansion in less than four years, UTRWD selected the Construction Manager at-Risk (CMAR) project delivery method.

How Converting SBR to Activated Sludge Created a Positive Effect on Operations

Operations staff at the Riverbend WRP had to be resourceful to keep the SBR adjusted and fine-tuned to meet increasing flows. Specifically:

- Eliminating floating mixers and the anaerobic stage to eliminate phosphorus release during the fill stage.
- Adding a magnesium hydroxide system to supplement alkalinity.
- Analyzing raw influent and SBR decant samples to determine optimum reaction times.
- Monitoring the sludge blanket, sludge volume index, and food to microorganism ratios to maximize setting velocities and minimize the duration of the settling stage.
- Increasing sequence volumes and reducing cycle times to increase the SBR capacity.

While these adjustments achieved permit compliance, they stressed plant staff. By converting the SBR to a new activated sludge process, UTRWD reduced operational complexity using a continuous flow process that can treat a wider flow range with reduced operator effort. This process provided greater reliability and produced high-quality plant effluent.

Results and Positive Contribution to the Environment, the Utility, and the Community

<table>
<thead>
<tr>
<th>GOAL ACHIEVED</th>
<th>ENVIRONMENTAL OR COMMUNITY BENEFIT</th>
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<tr>
<td>UTRWD improved operations by converting existing SBRs to activated sludge.</td>
<td>UTRWD made the treatment process more reliable, offering greater protection for the environment.</td>
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<tr>
<td>UTRWD doubled capacity within existing SBR basins by implementing a ballasted activated sludge system.</td>
<td>UTRWD minimized the footprint of the capacity improvements, which reduced capital cost, and made the treatment plant site more sustainable.</td>
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<tr>
<td>UTRWD achieved an accelerated project schedule using the CMAR delivery method.</td>
<td>UTRWD finished the project in a timely manner, allowing the surrounding community to continue to grow while maintaining public health.</td>
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