

Appleton Water Treatment Facility

HIGHLIGHTS

New 24-mgd treatment plant to replace an existing 18-mgd facility.

High-rate organic carbon removal through biological GAC contactors.

Diminished recarbonation requirements downstream of the lime softening process due to CO₂ production in the biological GAC contactors.

Diminished ultrafiltration fouling rates due to the removal of organic foulants through oxidation in the biological GAC contactors.

Carollo provided engineering services for the design of the new 24-mgd Appleton Water Treatment Facility, including an upgrade to biological GAC filters, which control taste and odors through adsorption and remove biodegradable organic carbon through biological oxidation. The design was based on water quality, treatability, and predesign studies conducted by Carollo and includes lime softening, recarbonation, and biological GAC contactors with 20 minutes of empty bed contact time. The new facility replaces Appleton's existing 18-mgd water treatment plant and provides capacity for additional demand and to meet current and eventual water quality standards.

The monomedia biological GAC contactors remove 1.5-2.0 mg/L of biodegradable organic carbon, thereby minimizing regrowth potential in the distribution system. The oxidation of organic compounds produces CO₂, which substantially reduces the recarbonation requirements downstream of the lime softening process. The biological GAC contactors are 48 inches deep and are designed for a 3.0 gpm/ft² loading rate.



The high-rate BAC filters at the Appleton Water Treatment Facility remove 1.5-2.0 mg/L of BDOC at a 20-minute EBCT.

Polysulfone ultrafiltration membranes were installed downstream of the biological GAC contactors. Demonstrated normalized flux rates are high (~109 gfd @ 20°C), partially due to the removal of potential organic foulants in the biological GAC contactors.

Using non-traditional project delivery method, Appleton hired a construction manager who worked directly with the engineer. Construction began prior to completion of the detailed design, similar to a design/build project delivery method.