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CASE STUDY / **WATER TREATMENT FACILITY UPGRADE**

UPGRADED DESIGN ALLOWS WATER TREATMENT FACILITY TO MEET INCREASING DEMAND

The Broomfield, Colorado, water treatment facility was entering its third decade of life and striving to serve a population that had more than doubled in size. After a preliminary design report, Broomfield set out to upgrade its aging equipment and expand its capacity.

DESIGN AND CONSTRUCTION COORDINATION MINIMIZED DISRUPTIONS

The design and construction teams worked in collaboration so that the water treatment facility, which operates year-round, was only taken offline for a short time during low-demand seasons.

PROJECT STATS

CLIENT
City and County of Broomfield, Colorado

LOCATION
Broomfield, Colorado

EXPANDED CAPACITY OF
26M
GALLONS PER DAY

PREPARED TO TRANSITION TO
32M
GALLONS PER DAY WITH FUTURE EXPANSION

CHALLENGE

Since the Broomfield Water Treatment Facility was built in 1997, the population it serves has more than doubled. After two decades, the facility's equipment was reaching the end of its useful life and was no longer in compliance, as the design criteria had evolved since its original construction.

The City and County of Broomfield set out to upgrade and expand the water treatment facility in 2017 to meet the increasing demand and achieve compliance. Regardless of the scale of upgrades or expansion, the water treatment facility needed a plan that would minimize disruptions to its operations — a plan that would take the facility offline for only a short period during low-demand season.

SOLUTION

In 2017, our team completed a preliminary design report for the facility, which included a detailed conditions and capacity assessment, identification and prioritization of improvements and opinions on probable cost. In this phase, the design team also determined that the existing administration and laboratory space was about half the size that is typical and necessary for the number of staff and type of testing performed at the facility.

Following the completion of the preliminary design report, our team was selected to design the water treatment facility improvements identified in the study. This included increasing the facility's capacity from a 20 to 26 million gallons per day (MGD), replacing existing equipment at the end of its useful life and bringing the facility into compliance with updated regulations. The improvements and design also considered an eventual expansion of the facility to 32 MGD.

Our team worked closely with the City and County of Broomfield to prepare construction plans and specifications. We also assisted in evaluating potential contractors for construction and contractor services when design was 30% complete, and prepared the necessary documentation to obtain all preconstruction-related permits and environmental compliance documents.

To provide the contractor with the ability to start elements of work early to meet the project timeline, our team prioritized the development of an early equipment procurement package and the filter building foundation.

Throughout the entire project, coordination of design and construction activities was critical to minimize the days the facility was offline and to see that these disruptions only occurred in the low-demand seasons.

RESULTS

The water treatment facility now has an expanded raw water metering and chemical injection vault, new rapid mix equipment, new vertical flocculators, an additional third stage of flocculation, upgraded lamella plate settlers and three additional filter cells in preparation for another future expansion to 32 MGD.

The project also improved the existing solids handling and chemical storage/feed facilities to eliminate significant maintenance issues. The chemical system improvements relocated the existing pretreatment chemicals into a new building closer to the point of application, providing a permanent home for new feed equipment and space for a future chemical of choice.

Other updates led to improved safety and maintenance. The new soda ash storage and feed building is now located closer to its injection point, which reduces the maintenance previously associated with a long run of feed piping. What was once an aqua ammonia storage and feed system is now a liquid ammonium sulfate system, which is safer for facility staff.

These improvements allowed the City and County of Broomfield to achieve compliance with regulations and meet the growing demand. The entire pretreatment system is now rated at 32 MGD, which will simplify the facility's future expansion to its intended build-out capacity of 32 MGD.

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