

BOULDER 63RD WATER TREATMENT FACILITY CAMPUS ELECTRICAL & HIGH SERVICE PUMP STATION PROJECT

Upgrading an aging water treatment infrastructure to ensure public health and a reliable water supply for the Boulder, Colorado community



County of Boulder Boulder, CO 2022- 2024



OVERVIEW

"Half of the value of this project contract was Weifield's scope; they steered the project as if they were the general contractor because of all of the work happening simultaneously during peak periods. Weifield demonstrated they were the 'A' team, every day," said Stephen Grooters, City of Boulder Civil Engineering Manager.

BACKGROUND



The core mission of the City of Boulder, Colorado's 63rd Water Treatment Facility (WTF) Campus Electrical and High Service Pump Station Project was to address aging infrastructure and upgrade water treatment infrastructure to ensure public health and a reliable water supply for the Boulder community.

The project schedule included two primary outage periods, both executed in the off-season. During these periods and throughout construction, all 63rd WTF outages were offset by increasing potable water production and delivery via the City's other potable water facility, the Betasso WTF.

Weifield's work with Archer Western (GC) started in June, 2022 and the renovations needed to be completed before the City could upgrade the infrastructure tank and process line at Betasso as there would be no redundancy to support that facility if the 63rd WTF went down.

SCOPE OF WORK



The 63rd WTF electrical scope involved:

- Installing 25,000 feet of brand-new medium voltage (MV) cabling and implementing new MV upgrades including switchgear and transformers
- Revamping the facility's backup to the existing raw water backup supply
- Implementing a new High Service Pump Station (HSPS)
- Demoing and renovating the Raw Water Pump Station and a raw water strainer vault
- Replacing HVAC systems and controls
- Renovating the dissolved air filtration building
- Adding logic to the system to accommodate a new 1,750KW generator that Weifield installed

"This project was the most complicated project in terms of coordination and planning that I've ever worked on," said Chris Wedow, Weifield Superintendent.

SOLUTIONS FOR POWER & EARLY PROCUREMENT

On the very first site walk, Weifield noticed a few concerns with respect to temporary power.

"There were many different buildings that needed to remain in operation during various shutdowns," said Chris Wedow, Weifield Superintendent. "Weifield's general superintendent had the idea to install a permanent temp power transformer—which the City would purchase. We were able to mitigate the need for six large generators by installing one transformer that provided temp power to all buildings."

Another large obstacle involved four oil-filled transformers that were needed—however the manufacturer could only provide one in the required timeframe.

"Any of these obstacles could have had detrimental impacts—luckily, we were able to come up with collaborative solutions early on, such as identifying the client's power needs early," Wedow added.

Weifield also helped the City transition from a small generator to a sitewide 1,750 KW generator that can carry the plant in limited capacity through production.

"It took months of meetings and working with the engineers and the City of Boulder to develop a system to remotely shut down utility solar fields and have the generator stay running in the event of an Xcel utility loss, then switch back over to utility power when it came back," said Angela Shouey, Weifield Project Manager.

SOLUTIONS TO OVERCOME ADDITIONAL PROJECT CHALLENGES

Weifield partnered with Eaton starting on Day 1 to help procure the needed equipment on the critical path due to Covid-19 supply chain issues.

"Weifield's team really hammered the tracking of materials and ensuring tight communications," said Jon Edwards, Archer Western General Superintendent. "This was one of the numerous areas where the owners' expectations were exceeded by Weifield."

Installation of MV Cabling and Outdoor Enclosed Switchgear A complicated phase was the installation of the MV cabling and the enclosed outdoor switchgear which required Weifield to rebuild the cabling, bucket by bucket.

"We'd take out each breaker, send it back to the factory for refurbishment, install the rental breaker and write a procedure when the original came back—taking the system offline to swap it back in before repeating the process for the next one," said Shouey. "We completed the entire phase well ahead of schedule."

Largescale Outage to Install New MV Power Loops in Utility Yard The 12-week largescale outage from February to April, 2023 involved installing new medium voltage power loops in the utility yard and bringing the large High Service Pump Station and equipment inside the buildings online, so they could start producing water. Weifield met with the GC general superintendent, Jon Edwards, six months ahead of time to begin planning.

"We had two major shutdowns—the first one was an eight-week window to split the plant in half on the distribution side. The second one was 12 weeks to get all the systems tied in and pumps started up, and to wire and start the plant," said Edwards. "Despite the challenges, we finished the project one week early."

EXCELLENCE IN PROJECT EXECUTION



Weifield performed a total of 22,324 worker hours on the project; the project peaked at 12 electricians. Planning and coordination were the key to field execution success.

"We worked with Archer Western before we had boots on the ground—identifying phases with risks or gaps. I also met weekly with the Archer superintendent to plan hurdles well in advance," said Wedow.

Weifield's approach to teamwork earned the crew the Archer Western 'Safest Crew of the Month' recognition for December, 2023.

Said Shouey: "Every team member was committed to building relationships. My husband had a heart attack during this project –I was living in the hospital and if it was any other job, I couldn't have done it. The comradery I experienced made a huge difference."



CONSTRUCTION INNOVATIONS

The project needed to incorporate thousands of feet of existing and new duct bank—Weifield decided to use fiberglass conduit and approached Archer Western about utilizing its Prefabrication team to accelerate this phase.

"Every inch of duct bank was welded, prefabbed and developed by our Prefab department and dropped onsite in 20-foot sections," Wedow said.



Another challenge arose involving the new utility equipment sitting outside the building—with the new switchgear running the high service pump station located in the floor below the electric room. To get power to the equipment in all locations, typically, Weifield would need to run conduit underground, underneath the pump station, and up three floors to the electric room.

"This would have been a nightmare to execute instead, we developed a plan that involved no conduit and we transitioned to using cable tray. This change saved a mountain of work and was added at no cost to the City," Wedow said.

As the team progressed, Weifield's BIM/VDC team helped model the cable tray pathway options for other areas, as well.

"With this solution, we were able to get rid of thousands of feet of conduit," said Wedow.



SAFETY FOCUS

The Weifield team experienced no incidents, accidents, or injuries on this two-year project. The main vehicles used to ensure safety were the dozens of Methods of Procedure (MOPs) created for each major task/shutdown.

"It was critical that we protect the interests of the City with continual water production while working in this aged facility; this required us to foresee potential risks and develop sound mitigation strategies," said Chris.

"Weifield was working with live equipment and figuring out how to transition between the old and new, safely, and without interrupting process. They truly excelled with ensuring the safety of the entire process and team," said Edwards.



EXCELLENCE IN CLIENT SERVICE / CONTRIBUTION TO THE COMMUNITY

The story of the team's efforts can perhaps be best told by the equipment and material stats, reflecting the sheer volume of material and equipment utilized or installed:

- Complete renovation Eaton MV Switchgear w/ (10) vacuum breakers, change
- from AC to DC controls ,and addition of ATO transfer system
- · 26,000 brand-new 500 KC mill feeders
- 18,000 feet of twisted shielded pair cabling
- 5,000 feet of fiber optic cable
- 161,000 ft. of wiring
- · Five new utility transformers
- 13 new Variable Frequency Drives (VFDs)
- · Brand-new 5-section magnum 480v Eaton switchgear
- · 2.5 new Motor Control Centers (MCCs0
- 18,000 ft. of medium voltage cabling
- 116 medium voltage terminations
- · 265 submittals between submittals and test



The campus was restored to service in May, 2024 without service interruption to the City's customers.

"I'm proud of the fact that we achieved a high level of quality and safety—as a result of our efforts, Weifield was selected as the key electrical partner on the City's next large water treatment project as well," said Edwards. "We are really happy with Weifield's performance; they had a genuine interest in communication and driving the schedule."

"I'm most proud of the growth of our apprentices on this project; they are now able to take the skills they learned here to excel on other projects," said Wedow.

Said Sean Timmins, Archer Western Project Manager: "Weifield had the right amount of staff, a strong field supervisor, and they excelled at communication. We were impressed with the amount of planning that went into the shutdowns which resulted in true cost savings."

"Weifield's temp power idea was the best value and one that we can use again," said Jon Edwards, Archer Western Superintendent. "From preconstruction to the field, to operations—we always enjoy working with the Weifield team."

> Inspired by Weifield's success story? Get in touch with us to start your journey toward outstanding results!

> > 1.877.WEIFIELD info@weifieldgroup.com

CASE STUDY