Betasso Water Treatment Facility

Category 5: Best Building Project – Specialty Contractor ($2M - $6M)

Ludvik Electric Co.

After almost a half century of continuous service, Betasso's water treatment facilities in Boulder, CO, had become deteriorated and outdated. Despite regular ongoing maintenance, the site required an overhaul that could produce enough clean water to meet the demands of Boulder's continuously growing population.

The Betasso Facility Renovation Project, in Boulder CO, consisted of the renovation of an over 60 year old existing water treatment facility, the installation of new campus infrastructure in the place of antiquated base, the removal and replacement of four outdated water treatment basins, and the construction of two new facilities on a historic campus.

Previous to the renovation Betasso provided 10 million gallons of clean water daily, but as the population of Boulder grows, so does the demand for clean water. After project completion the water treatment facility would have the capacity to provide four times the original 10 million gallons per day. Work was required to be completed without the interruption of water to the City of Boulder Residents and by upgrading the water basins, and infrastructure, the facility now has an expanded maximum production of 40 million gallons of clean water each day.

This project was comprised of multiple buildings, each performing different stages of the water treatment process. Two of the seven buildings on the campus were newly constructed. Three buildings received new Motor Control Centers. The existing 13.2KVA Secondary Unit Substation was renovated and a new Secondary Unit Substation was installed with a 1500 KVA transformer and an 800kw Cummins Diesel Generator. The two 20th century switchgears, which had fallen behind their times were updated to meet code and refurbished to secure operation of efficient feeds to the new and updated plant. From the Medium voltage distribution addition, to

the Pretreatment building being constructed over newly commissioned Basins, this project required an exceptional level of collaboration with all construction partners.

The overall nature of this project required unique short-term planning and scheduling capabilities. Supervisors utilized lean construction methods, including daily schedule updates, ad-HOC scope changes, and deliberate, calculated, "just in time" material deliveries. These unique capabilities were made possible by the exceptional team member collaboration between the City of Boulder, Moltz Construction, Ludvik strategic vendor partnerships, and dedicated crews and staff.

Ludvik Electric spent 22,800 hours to complete the project. Electricians completed the work on schedule and with zero lost time incidents. The transfer from existing utility to the new utility, projected two dozen tradesmen at task over a two-month duration, but due to innovative construction sequence and anticipated planning the time frame was reduced to a mere two-weeks.

An Architect's Supplemental Instructions can rarely be avoided on projects as large as Betasso. Design and execution must work together dynamically in order to create an efficient project that faces challenges productively. Addendums to the Motor Control Center's single line diagrams resulted in the necessity for more time and man hours to change feeder requirements and provide efficient energy without delaying the project schedule.

Betasso remained operational during construction and renovation which presented the challenge of constructing the pretreatment building over the newly constructed basins. While the pre-cast walls were set in place the basins remained in service. Once the pre-cast walls, structure beams, and twin T pre-cast roof were set in place, the interior construction of the Pre-treatment building was able to begin.

To avoid interruption to Boulder Residence Water Supply, the facility had to treat water using a single basin, for a single week. During that time electricians were able to tie in the new secondary unit substation, install five motor control centers, one new 1500KVA transformer, and a new 800KW Diesel generator, all on temporary power supplied by a temporary diesel generator. During the installation of raceway from ladders and scaffolding crews faced the risk of materials, tools and personnel dropping into the basins. To mitigate these hazards of falls into the basins, tie off protocol, tool lanyards, and material buckets were used to keep assets intact and out of the newly placed basins.

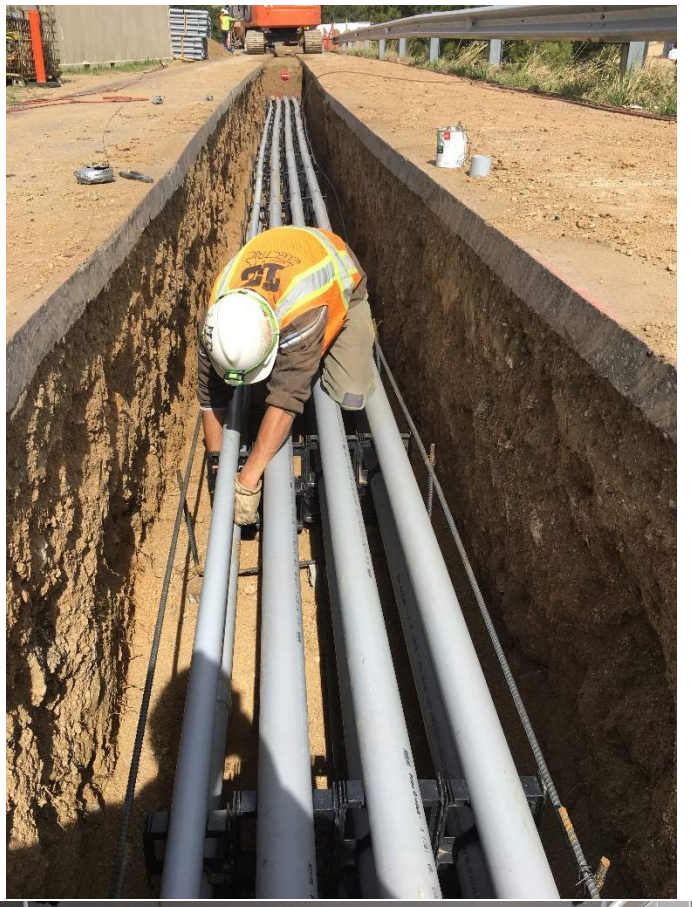
Betasso Water Treatment is located in the high country of Boulder, the remote location offers awesome views of Denver as it stretches eastward into the horizon. Associated with high peaks and remote locations come hazardous mountain conditions including weather and steep grade.

In order to complete a duct bank installation on 60% grade, rock climbing equipment and ropes were utilized to safe off personnel, materials, and tools. From the lower Switchyard to the new Secondary Unit Substation, electricians wore harnesses, tied off to ropes and anchored into the mountain in order to face challenges with excavation, raceway installation, and concrete encasement.

During the two and a half years that Betasso was under construction and renovation crews braved the Boulder winter season three times. Brutal winter conditions made access to the Betasso Canyon difficult to navigate. Ludvik crew members traded in 2-wheel drive fleet trucks for safer 4-wheel drives in order to travel safely without delaying the progression of work. High wind force during the spring and summer months also contributed to safety challenges by making work with cranes difficult to manage safely. With forecasted planning Ludvik crews were able to compensate for slowdowns caused by unsafe crane conditions and carefully schedule work to coincide with complimentary weather conditions.

In coordination with the construction of two new buildings, Ludvik was tasked with the renovations of existing buildings. The chemical Building, The DAF (Dissolved Air Flotation), Pre-Treatment building and The Hydro building, each had Motor Control Center overhauls, within a tight 30-month duration. While performing the demolitions, additions and renovations the water treatment facility remained functional. In two and a half years of construction, water treatment was continued daily. Buildings originally constructed in the 1960's were brought up to code and given upgrades to usher them into the demands of the 21st century.

As the population of Colorado continues to grow, the infrastructure of our communities must continue to grow and adapt accordingly. Ludvik Electric is proud to be a part of that growth and adaptation. By upgrading and updating the Betasso Water Treatment Facility, Boulder now has the capability to effectively treat 40 million gallons of water per day, compared to the 10 million gallons in previous years.

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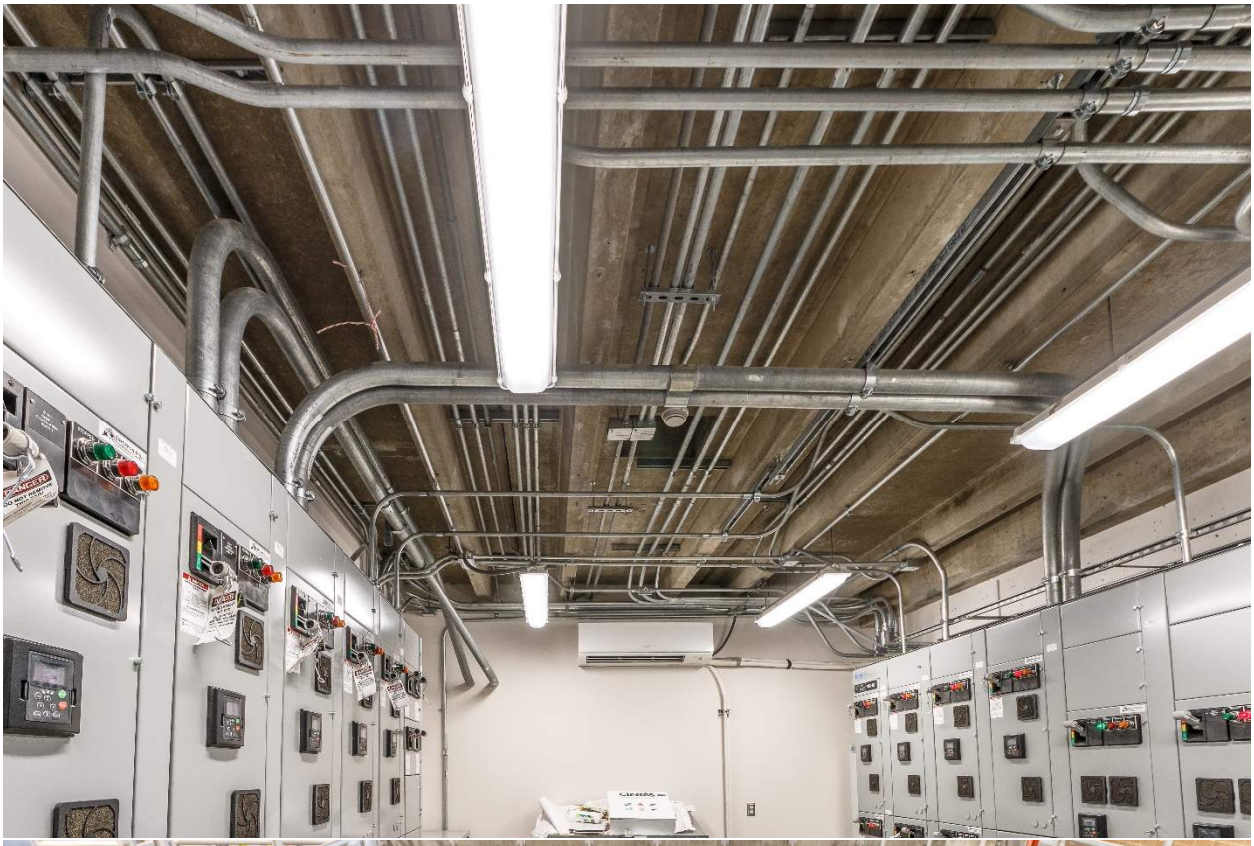


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