

## Carollo's Design-Build Services Provide Timely Solutions

Carollo is an environmental engineering and construction company specializing in the design and construction of water and wastewater facilities. During the past 10 years, we have provided design- and construction-related services for over \$1 billion of municipal water and wastewater facilities. Examples of our recent design-build projects follow.

### Experience Counts



*Utilizing existing plant infrastructure at Olathe's Water Treatment Plant No. 2, Carollo developed an innovative plan to meet peak demand without bringing membrane facilities online until months later. This eased a tight schedule and reduced construction costs.*

### City of Olathe, Kansas - Water Treatment Plant No. 2 Expansion Project

The City of Olathe currently has two water treatment facilities. Water Treatment Plant No. 1 is a surface water treatment plant with a capacity of 4 mgd. Water Treatment Plant No. 2 treats groundwater under the influence of surface water and has a capacity of 17 mgd.

High growth over the past six years, coupled with limited firm yield of Water Treatment Plant No. 1, drove Olathe to seek additional treatment capacity at Water Treatment Plant No. 2. Olathe selected Carollo to assess the expansion of this facility.

Carollo's study recommended increases in pretreatment and softening capacity through innovative modifications to existing infrastructure involving the addition of filtration capacity through low-pressure membranes. The expansion will increase overall capacity to 30 mgd, with provisions in the hydraulic system and building structures to supply up to 44 mgd in the future.

Due to a tight schedule that required the improvements to be complete by the peak demand season in 2005, Olathe opted for project delivery via design-build. Carollo maintained a leadership role and produced a 30 percent set of plans and specifications. The 30 percent design effort included membrane piloting for a three-month period in order to produce reasonable design criteria for four prequalified membrane manufacturers, and two alternative building designs competitive pricing on both submerged and module membrane systems. Carollo delivered the 30 percent plans and specifications on time to meet the project's aggressive schedule. Carollo then formed a joint venture with a national contractor to complete the construction of the \$20 million project.

### Lee County, Florida - Pinewoods Water Treatment Plant Reverse Osmosis Expansion

Carollo was hired by Lee County to provide design-build engineering services for the rehabilitation of the nanofiltration (NF) water treatment plant, and expansion by adding 3 mgd of reverse osmosis (RO) from the brackish Hawthorne Aquifer.

Carollo was responsible for the design and permitting of all facilities, which included rehabilitated NF equipment, a new RO process building, a new degasifier and odor scrubber system, a new 1-million-gallon (MG) ground storage tank, standby power, and complete rehabilitation of the high-service pump station, which was required to remain operational during construction.



*Carollo provided complete rehabilitation of the high-service pump station, which was required to remain operational during construction.*

*"Dedicated to creative, responsive, quality solutions for those we serve."*



### **City of Palm Coast, Florida - Reverse Osmosis Membrane Softening Water Treatment Plant Expansion**

Carollo is providing services for the design-build delivery of the Palm Coast Membrane Softening Plant expansion. Carollo's role is to provide engineering design, permitting, and construction-related services to the design-build team. The project is fast-tracked to implement these upgrades in the face of increasing water demands.

Value-added engineering services include upgrades to the NF feed pumping system with variable frequency drives, as well as the addition of interstage booster pumps to the membrane equipment, improving system performance in terms of hydraulic balance and water quality. Improved hydraulics balance will reduce the overall operating costs of this facility by reducing the electrical power consumed and potentially limiting membrane fouling by reducing lead membrane element flux rates. Energy cost savings alone are estimated to be \$30,000 per year for the Phase II expansion and \$45,000 per year for the Phase III expansion, with other efficiencies providing considerable additional savings. Additional upgrades will be implemented to the chemical feed, degasification, and high-service pumping equipment.



*Carollo's design updates the Palm Coast NF plant with state-of-the-art technology that will greatly improve the operational performance and costs.*

### **Town of Gilbert, Arizona - 4-MG Reservoir and Pump Station**

Carollo provided design and construction-phase services under a design-build delivery method for the Town of Gilbert's 4-MG reservoir and pump station project. This facility was Gilbert's first design-build project for a public works infrastructure project. Carollo designed the 4-MG reservoir and pump station to fill from the water system during off-peak hours and pump into the system during peak hours to meet demands and maintain water pressure in the region. The storage volume can be divided between the storage capacity of the reservoir itself and the

storage volume of the wet well of the pump station. Significant project elements included a 3.3-MG reinforced concrete reservoir, a 0.87-MG wet well, a vertical turbine pump station, a tablet feed calcium hypochlorite disinfection system, an instrumentation and controls (SCADA system), a standby emergency power system, and additional security measures.



*"The Town of Gilbert believes that it was an outstanding accomplishment to provide the needed water storage and pumping facilities at this location within the required timeframe and under the site conditions that were present."  
— Lonnie Frost,  
Public Works Director*

### **Contra Costa Water District, California - Randall-Bold Water Treatment Plant Distributed Control System Upgrade**

Carollo acted as the prime contractor for a design-build SCADA project for the Contra Costa Water District's Randall-Bold Water Treatment Plant. The project replaced the Moore Product distributed controllers located throughout the plant with modern state-of-the-art Modicon-Quantum PLCs and a human-machine interface system.

Carollo's design and configuration of the system allowed the new distributed control system (DCS) to be implemented without replacing the existing host computer system, thereby reducing the operator training required as part of the replacement.

The project included replacing the process control system network, demolishing the existing DCS control panels, reworking field connections, installing and programming the new DCS units, start-up of the new units, and testing of the overall system. The Randall-Bold plant is in continuous operation and only minor outages were permitted during the cut-over for which Carollo provided a detailed installation plan to minimize difficulties. In addition, Carollo currently has a maintenance contract to provide engineering software services for the complete DCS system at the Randall-Bold Water Treatment Plant.

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