



# construction management

*Carollo has provided construction management services for more than \$1 billion in municipal water and wastewater facilities in the last 10 years.*

Carollo provides a full spectrum of construction management (CM) services. We have provided construction-related services for more than \$1 billion in municipal water and wastewater facilities in the last 10 years, both as the design engineer and as a third-party construction manager. Nearly one-third of Carollo's annual revenues are attributable to construction-related services.

Our staff includes construction managers, resident engineers, and resident and specialty inspectors. Our construction managers and resident engineers are experienced in both the design and construction of water and wastewater treatment facilities. This benefits our clients because our staff knows what to look for and how to prevent problems before they occur. They can add value each time they handle a document—applying lessons learned as specialists in water and wastewater engineering.

Carollo also provides professional training and development of our staff in the ever-changing areas of safety, risk management, and claims consulting. Our resources include full computerized document tracking and scheduling capabilities, and specialty testing equipment.

Our expertise includes:

- ▶ Reviewing design plans and specifications.
- ▶ Developing construction management plans and master schedules.
- ▶ Preparing project delivery analyses.
- ▶ Implementing phased construction and multiple bid packages.
- ▶ Prequalifying equipment.
- ▶ Analyzing contract documents.
- ▶ Providing value engineering.
- ▶ Evaluating bids.
- ▶ Coordinating multiple-design consultants.



- ▶ Providing resident engineering and construction inspection.
- ▶ Testing services.
- ▶ Developing community relations programs.
- ▶ Managing changes and claims.
- ▶ Preparing cash flow analyses.
- ▶ Conducting project close-out, start-up, and training.
- ▶ Developing operations and maintenance (O&M) manuals.

Effective communication is essential for the successful completion of a construction project. To help all project participants stay abreast of project developments, we use a computerized project control system, Prolog<sup>®</sup> Manager. Prolog<sup>®</sup> is a nationally accepted construction management and documentation tool that offers Web-based document control and tracking. This system provides up-to-date information through features such as weekly schedule analysis, access to RFI status, change order processing, automatic updating of project log databases, and automated document control systems.



Carollo's track record in preventing and mitigating claims is excellent. In addition to offering experienced construction managers and resident engineers as a first line of defense against claims, Carollo's claims avoidance methods include pre-bid reviews, partnering, disputes review boards, and the timely handling of all documents and requests.

## Representative Projects - Construction Management

Client/Project	Project Elements														
	Interface with Regulatory Agencies	Cost Control	Scheduling	Contract Administration	Document and Drawing Control	Bid Evaluation and Award	Biddability and Constructability Review	Multiple Contract Coordination	Cost Estimating	Resident Engineering and Inspection	Final Testing and Startup	Environmental Mitigation	Partnering	Third-Party Construction Management	Negotiated Claims Settlement
City of Chandler, Arizona - Intel FAB-12 Infrastructure Improvements (\$1.3 billion)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
City of Glendale, Arizona - Arrowhead Ranch Infrastructure Development (\$27 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Maricopa County Flood Control District, Arizona - 7th Street Bridge (\$2 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
City of Phoenix, Arizona - Southern Avenue Interceptor (\$28 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
City of Benicia, California - Wastewater Treatment Plant Improvement Project (\$23 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Monterey Regional Water Pollution Control Agency, California - Salinas Valley Reclamation Project (\$25 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
City of San Bernardino, California - Primary Hydraulic Reliability Project (\$67 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
City of Santa Cruz, California - Secondary Upgrade Construction Management (\$50 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
City of Santa Cruz, California - Soquel Front Garage (\$7.3 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
City of Sunnyvale, California - Water Pollution Control Plant (\$12.5 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Vallejo Sanitation and Flood Control District, California - Secondary Treatment Upgrade (\$16 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Vallejo Sanitation and Flood Control District, California - Wet Weather Treatment Plant (\$19 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Western Riverside County Regional Wastewater Authority, California - Regional Wastewater Reclamation Facility (\$25 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Carson City, Nevada - Water/Wastewater System Improvements (\$38 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Clark County Sanitation District, Nevada - Central Plant Bar Screen Facility (\$32 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
City of Las Vegas, Nevada - Odor Control Phase 1 (\$5.3 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
City of Las Vegas, Nevada - Odor Control Phase 2 (\$8 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Southern Nevada Water Authority, Nevada - Alfred Merritt Smith Water Treatment Plant (\$68 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Southern Nevada Water Authority, Nevada - Water System Improvements (\$130 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Washoe County, Nevada - South Truckee Meadows Water Reclamation Facility (\$17 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
El Paso Water Utilities, Texas - Eastside Water System Improvements (\$35 million)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

## Val Vista Water Treatment Plant Construction

### HIGHLIGHTS

\$58 million water treatment plant upgrade and expansion.

Currently claim-free project.

Carollo operated and debugged entire facility before turning it over to the plant staff.

Facility has received excellent reviews from plant staff.

Carollo provided design and construction management services for the upgrade and expansion of the Val Vista Water Treatment Plant, jointly owned by the cities of Phoenix and Mesa. Carollo's involvement with the Val Vista plant began with the design and construction inspection services for the original 80-mgd treatment facility, which was placed into service in 1975. Recent upgrades bring plant capacity to 220 mgd. Design and construction of the latest upgrade/expansion took place in two phases.

The first phase was a hydraulic and instrumentation upgrade. This phase consisted of filter modifications, a new chemical handling facility, modifications to the electrical and instrumentation systems, reservoir modifications, a new used water recovery and solids dewatering system, and miscellaneous plant improvements to bring the plant into compliance with key regulatory guidelines and provide for more reliable and efficient plant operation. The second phase, which was being designed as the first phase was constructed, increased plant capacity by 80 mgd. This phase included new water inlet facilities, a raw water pump station, presedimentation, flocculation and final sedimentation basins, monomedium filters, expanded chemical handling facilities, chlorine disinfection facilities, administration building modifications, and expanded distributed control systems (DCS) instrumentation.

Both projects required extensive planning during design and coordination during construction to minimize disruption and maintain uninterrupted treatment capacity. The project included new electrical service to handle the expanded plant as well as proposed future expansion.

Carollo's construction team consisted of a construction manager, a full-time on-site resident engineer and assistant resident engineer, a construction scheduler, and inspectors for each of the major process areas to support the on-site team. The construction management staff

used a proactive approach and state-of-the-art equipment and software to track and store documents. All documents, including shop drawing submittals, progress payments, requests for information, change orders, and claims management/avoidance documentation were logged and tracked using Primavera Expedition® software.



*Carollo used a proactive approach that included computerized document tracking to successfully manage a major upgrade and expansion of the Val Vista Water Treatment Plant.*

# EAST BAY MUNICIPAL UTILITY DISTRICT, OAKLAND, CALIFORNIA

## Wet Weather Storage Basin

Carollo provided design and construction management services for the East Bay Municipal Utility District (EBMUD) wet weather storage basin project. The \$24 million project consists of an 11-million-gallon reinforced concrete raw wastewater storage basin, a 120-mgd flow diversion structure and conveyance facilities, an 80-mgd return pump station, and primary effluent bypass structures.

Challenges faced by the design and construction teams included the need to locate the 40-foot-deep basin on a crowded site with a high groundwater table and soil conditions consisting of 10-foot-deep sand and gravel fills overlying 110 feet of extremely compressible marine clay known as “bay mud.” Carollo met these challenges by writing extremely tight specifications for shoring and excavation systems which limited movement at the excavation wall to 2¾ inches. Strict design criteria for the shoring system specified maximum stresses on shoring members and minimized groundwater leakage into the excavation to prevent the surrounding soils from settling.

The congested construction site was surrounded by critical plant structures, including the final effluent channel, a 1.2-MW power generation station, and a bank of 12 anaerobic digesters. During the design phase, Carollo specified detailed project constraints to limit the contractor’s interference with plant operation. During construction, the construction management team installed extensive ground movement and vibration

monitoring instruments. Monitoring the instruments routinely provided early warning of ground movement that could potentially damage existing structures.

A full-time EBMUD coordinator, working in the same field office under the direction of Carollo’s construction manager, provided daily coordination with EBMUD. Weekly and monthly coordination with the contractor and EBMUD personnel also contributed to the project’s successful coordination.

### HIGHLIGHTS

\$24 million wet weather treatment addition.

40-foot-deep excavations on a congested site in difficult soil conditions.

Design specifications and construction procedures to limit ground movement and minimize impacts to plant operation.

Daily coordination between client and consultant staff.



*Construction of EBMUD’s wet weather storage basin required a state-of-the-art shoring system for the deep excavation in bay mud.*

# MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY, MONTEREY, CALIFORNIA

## HIGHLIGHTS

\$26 million wastewater facility expansion.

Excellent communications with stakeholders and operations staff through partnering sessions/weekly meetings.

State-of-the-art document tracking and storing.

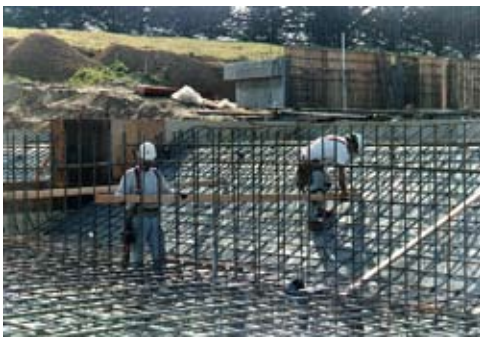
Claim-free project.

## Salinas Valley Reclamation Project

Carollo provided third-party construction management services for the Monterey Regional Water Pollution Control Agency's (MRWPCA) Salinas Valley Reclamation Project. This unique project will supply food crop growers with as much as 30 mgd of reclaimed water for use as irrigation water. The project consists of a full Title 22 unrestricted use reclamation plant, irrigation water storage basin, and a two-mile, 31-inch irrigation water supply pipeline. Also included were two pipeline river crossings that were constructed using the directional drilling method and modifications to MRWPCA's ocean outfall pipe.

Our construction management team worked closely with the MRWPCA staff and utilized an MRWPCA inspector as part of the team. Through formal partnering sessions and quarterly partnering updates, our team maintained excellent communications with MRWPCA, the contractor, crop growers, and regulatory agencies. Weekly meetings were held with all major stakeholders to maintain communication and coordinate activities. Frequent communications, with the existing wastewater treatment plant staff, such as our weekly "coffee clutch" group with operators, enhanced coordination of construction with the plant operation.

The construction management staff used state-of-the-art equipment and software to track and store documents. Documents were logged and tracked using Primavera Expedition® software. In addition, all documents (except submittals) were scanned and stored electronically using Waterworks® software.



*Carollo utilized a partnering approach to provide third-party construction management for this plant expansion which will provide 20 mgd of reclaimed water to local growers.*



## Secondary Upgrade Construction Management

Carollo provided third-party construction management services for an upgrade of the City of Santa Cruz wastewater treatment facility at Neary Lagoon. The project will enable the Santa Cruz to meet the most stringent federal and state guidelines for wastewater treatment. The project upgraded advanced primary treatment processes to full secondary treatment, allowing discharge of up to 18 mgd of treated effluent per day into the open Pacific Ocean currents two miles offshore. The treated wastewater is discharged through an existing outfall pipe extending along the ocean floor in 110 feet of water.

The work on this \$50 million project included construction of a pile supported digester, a drilled pier supported 61-mgd interstage pumping station, six trickling filters, three solids contact (aeration) tanks, three pile supported secondary clarifiers, an equipment gallery with aeration blowers, an odor reduction facility, a pile supported power generation building, administrative offices and laboratory facilities, an effluent filtration facility for in-plant use of effluent, and an ultraviolet disinfection facility.

Our field staff included a half-time construction manager, a full-time resident engineer, and a lead inspector, who functioned as extensions of the Santa Cruz staff. The environmentally-sensitive nature of the surrounding area, which includes the protected wetlands to the north

and the Monterey Bay Marine Sanctuary to the south, presented some special challenges to the construction management effort. The project was guided by strict noise restrictions, which include a sound barrier along Neary Lagoon to protect mating waterfowl.

In addition to environmental considerations, the project included state-of-the-art equip-

ment and software to track and store documents. The construction management team used Primavera Expedition® software to manage submittals, requests for information, change orders, correspondence, and all other related documents. Carollo provided specialty electrical and instrumentation inspectors, as required.

HIGHLIGHTS

\$50 million wastewater treatment plant expansion.

Difficult bay mud soil conditions requiring pile- and pier-supported structures.

Close proximity to residences requiring strict noise restrictions to mitigate impacts to community and local wildlife.

Public information program.

Claim-free project.

*“The services provided to the City of Santa Cruz by Carollo Engineers have been first rate, and are equal to the best that I have witnessed during twenty years with the Clean Water Program.”*

*—Alan Garbitt, California State Water Resources Control Board Representative*



*The proximity of the Santa Cruz Wastewater Treatment Plant to protected wetlands and the Monterey Bay Marine Sanctuary presented some special challenges to Carollo’s construction management effort.*

construction management

# WESTERN RIVERSIDE COUNTY REGIONAL WASTEWATER AUTHORITY, RIVERSIDE, CALIFORNIA

## HIGHLIGHTS

\$25 million tertiary treatment facility.

Unique design/build project.

Partnering approach.

## Regional Wastewater Reclamation Facility

Carollo provided third-party construction management (CM) services on a unique design/build project for the Western Riverside County Regional Wastewater Authority (WRCRWA). The project included construction of a new 8-mgd tertiary treatment facility that meets more stringent discharge guidelines for the Santa Ana River. In an effort to control costs, WRCRWA adopted a design/build concept and selected Carollo to provide CM and design/review services. The most unique feature of the design/build concept was the substitution of bid document specifications with specifications developed by the contractor's design engineer during the first four to six months of the construction period.

The project included a headworks, biological secondary treatment, solids handling, and tertiary treatment. Secondary treatment includes a Carrousel® process with anoxic chambers for nitrogen removal, aerobic digestion, centrifuge biosolids dewatering, and tertiary filtration.

With WRCRWA providing overall direction, Carollo used a partnering approach to CM to establish goals and promote teamwork. Carollo's construction management team provided issues resolution procedures, design review, review/approval of "or equal" substitution specifications, and quality control. In addition to a full-time construction manager, the construction management team included an on-site resident engineer and specialty inspectors.

The CM team identified issues and established procedures during the review/approval process to move the project from owner-furnished to contractor-furnished design. Primavera Expedition® software helped to

manage submittals, requests for information, change orders, correspondence, and all other related documents.



*Through formal partnering sessions and quarterly partnering updates, our construction management team maintained excellent communication with all stakeholders in Western Riverside's Regional Wastewater Treatment Facility.*

# SOUTHERN NEVADA WATER AUTHORITY, LAS VEGAS, NEVADA

## Southern Nevada Water System Improvements

### HIGHLIGHTS

\$145 million water system improvement project.

Construction administration and inspection services for 17 separate construction contracts and three prepurchase contracts on a tight schedule.

Facility operation maintained during construction.

All claims successfully negotiated.

Completed on time and within budget.

Carollo, in joint venture, provided construction administration and inspection services for the \$145 million Southern Nevada Water System Improvements Project. This project (which is described in detail elsewhere in this SOQ) includes: expansion of the existing Alfred Merritt Smith (AMS) Water Treatment Plant to 624 mgd, a 12-foot-diameter tunnel, a new water reservoir, and additional pipelines and pump stations.

The joint venture team was also responsible for design of the world's largest ozone generation system. With a construction cost in excess of \$60 million, the AMS system provides preozonation in advance of flocculation and filtration.

Carollo took the lead in providing construction administration services. The team managed 17 separate construction contracts and three prepurchase contracts on a tight schedule to meet the increasing water demands of the rapidly growing Las Vegas metropolitan area. The timely completion of each construction project was critical to the overall success of the

total expansion project. Work included construction activities in three separate work areas and coordinating the construction around the treatment plant's operations to ensure a consistent and reliable water supply for Southern Nevada Water System's customers. Another firm provided program management for the projects.

The team provided well coordinated, integrated, and scheduled services under the direction of Carollo's manager. Construction began in 1995 and was completed in 1997. The team provided a full-time construction coordinator, three resident engineers, three assistant resident engineers, and 14 construction

inspectors. Services included field inspection; resident engineering; shop drawing and RFI review/response; partial payment request processing; change order review, negotiation, and recommendations; and claims management.

*“An additional characteristic of the company is its dedication and commitment to meeting the plant operators' needs. Carollo met with the operators on a regular basis to gain mutual understanding in regard to the plant's new treatment and process chain. In addition, the firm demonstrated its comprehension of new technology.”*

*—J.T. Monscvitz, Former Director of Operations,  
Southern Nevada Water System*



*The timely completion of each of 17 construction contracts was critical to the overall success of the total expansion project.*

