




*County of Santa Cruz*



**Consulting Services to Design Tertiary  
Treatment Upgrades to  
Boulder Creek Sewage Treatment Plant**

***Qualifications***

***May 9, 2007***

** LEE & RO, Inc.**

May 9, 2007

Ms. Rachél Lather  
Senior Civil Engineer  
County of Santa Cruz  
701 Ocean Street, Room 410  
Santa Cruz, CA 95060

**Re: *Statement of Qualifications to Provide Consulting Services to Design  
TERTIARY TREATMENT UPGRADES TO  
BOULDER CREEK SEWAGE TREATMENT PLANT***

P07-36

Dear Ms. Lather:

In response to your Request for Qualifications, dated April 18, 2007, LEE & RO, Inc. is pleased to submit our Statement of Qualifications for your review and consideration.

#### **OUR FIRM**

With a strong company presence and history in Southern California, LEE & RO, Inc. has recently expanded our Northern California operation and is able to provide the County of Santa Cruz with experienced local resources specializing in tertiary treatment facility design. Our offices in Walnut Creek and Sacramento are staffed with knowledgeable Project Managers and multi-discipline technical staff, whose expertise include wastewater and water process, pumping and collection systems, storm water, structural, electrical and control systems engineering, planning and design.

#### **EXPERIENCE**

LEE & RO was began as a wastewater design firm and, while our product lines have expanded, wastewater plant design remains a cornerstone of excellence at the firm. Our proposed team recently completed designs for treatment plant expansions in the nearby Cities of Patterson and Angels, and we are currently under contract to complete designs for the next expansion at the neighboring Patterson treatment facility. We encourage City staff to speak with (retired, now consulting) Patterson Public Works Director, Ignacio Lopez (209/652.1229) or Plant Operations Manager, Joel Cockrell (209/892.8886) regarding the work we recently completed and the current project we are designing at their plant.

#### **THE PROJECT TEAM**

LEE & RO's Project Manager, **Bob Godwin**, brings the project his unique hands-on style and experience. Bob is skilled at evaluating alternative designs, particularly for small and unusual facilities, and working with engineering and operations staff to implement cost-effective and practical project solutions. Bob will be supported technically by the group of talented individuals highlighted below.

- Our firm's two founding partners, **Don Lee** and **Steve Ro**, will serve as a Technical Advisors to the team, helping to shape the project's direction. Don and Steve built the company on their commitment to quality, economy, and creativity, and will provide the team with facilitative technical input throughout the project's design.
- **Tom Bergin** will bring his extensive experience with designing and rehabilitating simple to complex treatment process facilities. **James Pollock** will interface with Bob and Tom to complete the civil design at the plant, bringing his recent experience from a similar role on the Patterson project.

- Design discipline work will be done in-house, with structural efforts led by *Clayton Cheng*, and electrical and instrumentation systems designed by *Greg DeBois*. Clayton has designed facilities at the Patterson and Valley Sanitary District plants, and he clearly understands potential issues associated with wastewater treatment plant structural designs in California. Greg has worked specifically in the municipal infrastructure business for over 10 years, and has a strong understanding of the steps needed to fully implement a project of this type.
- At this time, we do not anticipate needing services from subconsultants. Should the need be identified, we have strong working relationships with surveying, geotechnical, and corrosion engineer specialty firms.

As LEE & RO's Northern California Regional Manager, I will provide local oversight for all work performed for the County and will check in frequently as the project progresses, in order to make sure that expectations are being met and that the project is proceeding as planned. Key staff will be located in our local offices, where the majority of work will be performed. Additional staff support will be provided from our City of Industry Headquarters offices in order to provide benefits of knowledge from experience obtained from work with similar types of projects in other geographic areas.

LEE & RO looks forward to demonstrating to the County the quality and responsiveness of our engineering services. If any additional information is needed, please don't hesitate to contact me at 925/937.4050 ext 401, or at [Christine.lindow@lee-ro.com](mailto:Christine.lindow@lee-ro.com).

Respectfully,  
LEE & RO, Inc.



Bob Godwin, P.E.  
Senior Project Manager



Christine S. Lindow, P.E.  
Vice President/Northern California Regional Manager





## FIRM HISTORY & EXPERIENCE

### LEE & RO, INC. HISTORY

LEE & RO is a medium-sized, multi-discipline engineering firm that specializes in the planning, design, and construction management of municipal water and wastewater facilities.

Throughout our 28-year history, LEE & RO has successfully planned, designed, and provided construction management services for numerous water and wastewater system projects. Project construction costs have ranged from very small projects to projects having up to \$40 million in constructed value. Our firm's experience encompasses a wide variety of water projects ranging from small 500 gpm well-head installations to a 40 cfs capacity booster pumping station. The expertise of the professionals in our firm includes hydraulic analysis and surge control, utility engineering, civil and structural engineering, mechanical design, electrical and instrumentation system design, construction management, facility start-up, plan and specification preparation, and cost estimating.



Currently, LEE & RO's organizational structure is made up of nearly 100 employees, including over 50 registered professional engineers and 15 CAD designers and operators. M. Steve Ro, a co-founder of the company, is the owner and President of the organization. Our growing Northern California operation includes established offices in Sacramento and Walnut Creek. These two local offices have a staff of 12 professionals, including seven registered engineers, three Engineers-in-Training and two engineering interns.



LEE & RO offices are fully integrated through our wide area network, and we routinely share resources between offices in order to meet the project requirements/schedules of our clients. As Vice President, Northern California Regional Manager, and Principal-In-Charge for this project, Christine Lindow, PE, has the authority to reassign LEE & RO resources as needed for our Northern California projects. As PIC, she affirms that the staff

shown in this proposal are all available to execute this work as scheduled.

LEE & RO has enjoyed an excellent financial history since the Company's inception in 1979. The City may consult with Dun & Bradstreet regarding our financial rating (LEE & RO D&B No. 03-706-9549). LEE & RO's current D&B rating is 3A1. LEE & RO banks with California Bank & Trust and we have an unsecured business line of credit in the low seven figures. LEE & RO has no unpaid judgments against us and has had no disputed claims in the past five years. The firm has never defaulted or been terminated on the basis of failure to perform on a contract. It is a testament to our culture of providing high quality services that over 90% of our current growing backlog is repeat business from existing clients.





## REPRESENTATIVE LEE & RO PROJECT EXPERIENCE

Project Name	Client	Contact	Phone
Wastewater Treatment Plant (WWTP) Phase I and II Expansions	City of Angels	Gary Ghio	209/754-1824
Wastewater Treatment Plant Phase 1 and Phase 2 Expansions	City of Patterson	Ignacio Lopez	209/652-1229
Float Pumping System Modifications, Water Pollution Control Facility,	City of Sunnyvale.	Chuck Neumayer	408/730-7834
Water Reclamation Plant 4, 7, and 10 Projects	Coachella Valley Water District	Elsie Meyer	760/398-2651
Wastewater Treatment Plant Expansion	Valley Sanitary District	Rex Sharp	760/347-2356
Plant Headworks/Grit Removal System Improvements, Regional WWTP,	Sacramento Regional County Sanitation District	James Morris	916/875-9168

### WASTEWATER TREATMENT PLANT (WWTP) PHASE I AND II EXPANSIONS, CITY OF ANGELS

LEE & RO provided engineering and construction management services for Phase I and II Expansions of the City's tertiary Wastewater Treatment Plant. Phase I design included a new headworks with screenings and grit removal, flow equalization, sequencing batch reactor (SBR) aeration tanks, secondary clarifiers, Title 22 filtration (coagulation and flocculation, continuous-backwash filters) Parkson Dynasand®, a chlorine contact tank, intermediate and effluent pumping stations, aerobic digestion, sludge drying beds, sitework, piping, and electrical systems. All plant effluent is reclaimed either for irrigation of a golf course or for irrigation of farmland. In June 2002, The City retained LEE & RO for planning, design, and construction management of 0.2 mgd Phase II expansion of the WWTP, which includes another 0.2 mgd SBR basin, replacement of the existing biosolids handling facilities, and Title 22 chlorination. Two new aerobic digesters were constructed along with chemically enhanced drying beds. At this facility, digested sludge is disposed of both dry and wet. Thickened sludge is either hauled off-site by an independent contractor, or dewatered on-site by the City for local disposal. The total construction cost of both phases was \$6 million.



### ON-CALL ENGINEERING SERVICES FOR WASTEWATER TREATMENT, CITY OF IONE, IONE, CALIFORNIA

LEE & RO is providing engineering services, including on-call services, to the City of Ione related to their wastewater treatment needs. These services include preparing a revised water balance and other engineering services required of the City by the Regional Board for compliance with a Cease and Desist Order. Additional services include providing technical engineering support for the preparation of an EIR for the expansion of the treatment facility required for planned residential development within the service area. LEE & RO is providing engineering services to the City for the development of a Joint Powers Authority which will manage wastewater effluent disposal needs of the City along with those of the California Department of Corrections Mule Creek Prison and those of the Amador Regional Wastewater Authority. Future services will include preparation of an updated Wastewater Management Plan. This plan will focus on future water reclamation needs.



### WASTEWATER TREATMENT PLANT PHASE I, PHASE II, & PHASE III EXPANSIONS, CITY OF PATTERSON

LEE & RO has provided the City of Patterson with planning, regulatory support, design, and construction management services at their WWTP since 1999. These services have included a



\$5M Phase 1 WWTP Expansion that increase the facility capacity from 1 to 1.5 mgd. Phase I project elements included a 33-inch interceptor, headworks, influent pumping station, 0.5 mgd Advanced Integrated Pond System (AIPS), effluent pumping station, 11 percolation ponds, and chlorination system. The Phase II Project expanded the WWTP from 1.5 to 2.75 mgd in the short-term, with an ultimate capacity being 4.0 mgd. Phase II design services, included preparation of a comprehensive EIR, consultation on the Waste Discharge Requirements with the Central Valley RWQCB, determination of effluent percolation rates and development of a groundwater monitoring and management plan, land acquisition, a preliminary design report, final design, cost estimating, bidding assistance, construction management/resident engineering, and start-up services. Phase II was completed in September

2005. The Phase III design was started in the fall of 2006 with final design to be completed by the end of 2007. This next phase of this work will include Title 22 tertiary treatment for a portion of the effluent and will expand the overall secondary treatment capacity to 4.0 mgd.

### MALIBU WATER POLLUTION CONTROL PLANT, DEPT OF PUBLIC WORKS, LOS ANGELES COUNTY

LEE & RO prepared a project report, plans and specifications, and provided construction support services for a major upgrade and expansion of the Malibu Water Pollution Control Plant (WPCP). The existing WPCP was over 30 years old and most unit processes were not producing effluent meeting Waste Discharge Requirements (WDR) issued by the Los Angeles Regional Water Quality Control Board. Facilities were corroded and major rehabilitation was needed. LEE & RO tasks included assisting with preparation of State Revolving Fund (SRF) documentation including a revenue plan and environmental study, performing a hydrogeological study and establishing a groundwater monitoring program in accordance with the WDR. The monitoring program



determined whether or not the plant effluent impacted the groundwater quality in the plant vicinity and the Malibu Lagoon. The upgraded WPCP includes a headworks with a comminutor and new flow meter, an extended-aeration system (activated sludge tanks with anoxic selectors for future nutrient removal), secondary clarifiers, continuous-backwash up-flow filters, a chlorination system, effluent pumping and metering, and effluent disposal seepage pits. The WPCP is designed for an average flow of approximately 30,000 gallons per day (gpd) and an instantaneous peak of approximately 180,000 gpd. LEE & RO also assisted the DPW with effluent NPDES discharge and California Coastal Commission permits.





## Trancas Water Pollution Control Plant (TWPCP), Los Angeles County Department of Public Works (LACDPW)

The TWPCP was built by a private developer in 1963 and, in 1979, was upgraded to include secondary treatment facilities and polishing effluent filters. It was designed for an average daily dry weather flow of 75,000 gallons per day (gpd) and a peak flow of 150,000 gpd. The TWPCP



consists of a headworks, an influent pump station, two primary clarifiers, one rotating biological contactor (RBC), two secondary clarifiers, one aerobic digester, a dual-cell sand filter, and three effluent leachfields. High infiltration to collection sewers caused influent flows to reach 288,000 gpd, far in excess of the plant design capacity. LEE & RO prepared an engineering report and assisted the County in obtaining State Revolving Fund (SRF) financing. The project included a new headworks and influent pump station, conversion of existing primary clarifiers to an equalization basin, replacement of the RBC with extended

aeration activated sludge with secondary clarifiers, conversion of the secondary clarifiers into secondary effluent equalization and filter feed wet well, new filters, and a new chlorination facility. The activated sludge process was equipped with anoxic selector cells for future nitrogen removal. The design of the \$3.9 million project was completed in January 2005 and the construction was completed in March 2007. LEE & RO designed monitoring wells and provided the ground water quality monitoring services.

## FLOAT PUMPING SYSTEM MODIFICATIONS, WATER POLLUTION CONTROL FACILITY, CITY OF SUNNYVALE.

LEE & RO provided study, design and construction support services for a \$250,000 project for automation of float pumping system. Algae from the main plant tertiary ponds are removed by dissolved air flotation units and pumped to the digesters via an algae pit, where algae is removed as float. This project was to automate the algae separation and pumping processes by the use of an in-line density analyzer and automatic valves. A new pump discharge manifold was constructed at the float pump station that allowed the automation process to occur. The discharge manifold contained automatic valves, transmitting flow meters, a density analyzer, interconnecting piping, and the SCADA interface of the instrumentation and control valves. Additional in-plant piping and piping interconnections were included within the treatment plant to allow the transfer of float to the digesters.





## WASTEWATER TREATMENT PLANT EXPANSION AND UPGRADES, VALLEY SANITARY DISTRICT, INDIO

LEE & RO is responsible for process analysis, technical memoranda, master planning, plans & specifications, bidding, and construction management services for a \$49 million plant expansion and improvements project being implemented in two phases. The \$24 million Phase 1 project will increase the activated sludge plant capacity from 5 to 10 mgd (including the 3.5 mgd capacity of the constructed wetlands and aeration ponds, total plant capacity will be 13.5 mgd). Phase 1 facilities include new aeration blowers, modification of aeration basins (anoxic and oxic cells), circular secondary clarifiers, chlorine contact tanks, 54-inch outfall, and sludge dewatering belt presses. The \$25 million Phase 2 project includes new vortex grit removal, primary clarifiers, gravity belt waste activated sludge thickening, anaerobic digestion, odor control, and a cogeneration system. The Phase 1 construction contract was awarded in August 2006 the Phase 2 project will bid in winter of 2008.



## WATER RECLAMATION PLANT 4, 7, AND 10 PROJECTS, COACHELLA VALLEY WATER DISTRICT COACHELLA, CA



LEE & RO provided water reclamation plant engineering, design, and construction services for three water reclamation Plants: \$11M, 5 mgd tertiary filtration facility addition with chlorination and chlorine building with chlorine scrubber, three high-head pumping stations, two reservoirs at WRP 10; \$6M, secondary plant expansion at WRP 7; \$4M, chlorination/dechlorination facilities at WRP 4; \$15M secondary plant expansion at WRP 4; and \$8M tertiary filtration facility addition at WRP 7.

## SYSTEM IMPROVEMENTS, WASTEWATER TREATMENT PLANT, SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT (SRCSD), ELK GROVE

The Sacramento Regional Wastewater Treatment Plant normally treats wastewater flows of about 120 million gallons per day (mgd) and peak flows to the plant often approach 260 mgd. The plant has four aerated grit tanks, each with five grit hoppers and every hopper connected to a recessed impeller grit slurry pump. Slurry is pumped to the grit classifier building where it is processed with cyclone grit separators and washers. Grit is pneumatically transported to the storage bins. SRCSD has experienced numerous problems with the entire grit separation, transport, dewatering, and truck loading processes. Aerated grit removal tanks are inefficient and accumulate scum, grit slurry piping needs excessive maintenance, grit separation and washing systems are undersized and inefficient, and the grit transport system needs excessive maintenance. In May 1999 LEE & RO prepared a study and design for the grit system improvements. Project goals were to improve grit removal efficiencies, solve grit slurry pumping problems and increase efficiency of the grit dewatering and classification system. An additional goal was to find solutions to move trapped scum to the primary sedimentation distribution channel. LEE & RO tasks included plant testing of grit separation and washing, aerated grit removal tank model testing, preparation of pre-design report and preliminary design. Eutek SlurryCup, JETA Grip Trap, and WEMCO Hydrogritter were tested and the WEMCO Cyclone/Hydrogritter system was recommended. LEE & RO assisted SRCSD with design of the test plant installations, consulted regarding testing and sampling protocols, and helped run the equipment testing. LEE & RO built a physical model of the aerated grit removal tanks and tested hydraulic behavior, inlet energy/water-roll phenomenon, and other process variables.

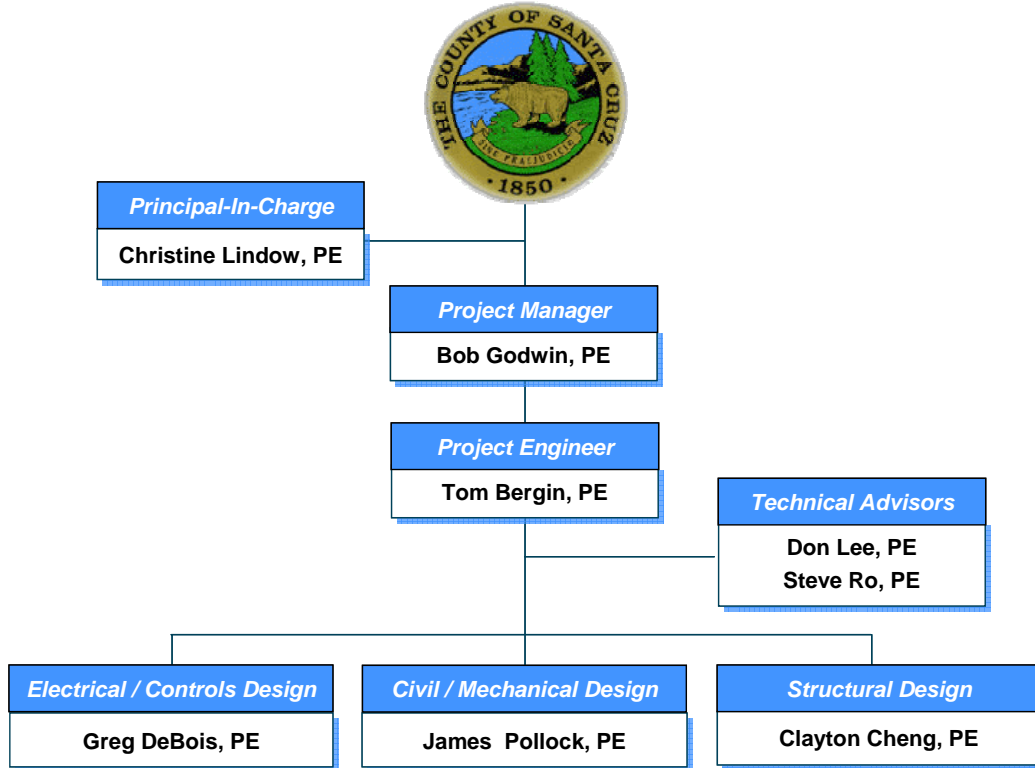






## PROJECT TEAM

LEE & RO has assembled a local team of experienced professionals who are available to complete this project. Our organization chart is presented below, followed by brief biographies of key project staff. More extensive resumes are provided as an Appendix to this proposal and additional detail and/or depth of staffing is available upon request.



### Bob Godwin, PE

*Project Manager*

Bob has nearly 20 years of experience in the areas planning and design for wastewater and water, infrastructure and municipal facilities. He has supervised designs for numerous public works project and his local project experience has ranged from wastewater treatment facilities and wastewater collection systems design to water systems computer modeling, pipeline, pumping stations, and water treatment systems design. Bob has prepared feasibility studies, preliminary design reports, plans & specifications, and construction estimates for wastewater collection/treatment/ reclamation projects. He has worked extensively with Regional Boards to assist clients in obtaining necessary operating permits.

### Tom Bergin, PE

*Project Engineer*

Tom has extensive expertise in solving unique challenges posed by retrofit designs, particularly relating to replacement of mechanical and electrical equipment. He served as Project Manager for upgrades at the City of Sunnyvale's water pollution control plant, and is currently leading the design of improvements to the plant's oxidation pond system. Tom has over 25 years of engineering and construction management experience in the areas of water and wastewater infrastructure and facilities, stormwater, and drainage design. He is an experienced problem solver who specializes in "making things work".





### **Christine Lindow, PE**

#### *Principal-In-Charge*

Christine has 25 years of engineering experience with an emphasis in planning, design and construction management of wastewater and water treatment, storage and transmission infrastructure facilities. She has provided design services for new and retrofit pipeline and reservoir projects, including wastewater collection system piping, potable water pipelines, recycled water distribution systems, steel tanks, cast-in-place concrete structures, and precast concrete reservoirs.

### **Don Lee, PE**

#### *Technical Advisor*

Don Lee, one of the two founding principals of the firm, has experience in wastewater treatment process engineering, plant and pump station design, odor control, digester-gas fueled energy recovery, and pipelines. He has experience with process selection, feasibility studies, design reports, hydraulic analyses, drawing and specification preparation, and value engineering. Mr. Lee also has extensive experience with technical reviews, constructability review, and QA/QC. He is the firm's Corporate Quality Assurance Officer.



### **Steve Ro, PE**

#### *Technical Advisor*

M. Steve Ro, one of two founding LEE & RO partners, has systems planning, project management, engineering, and construction experience with pumping, pipeline, treatment, reclamation, recycling, odor control, mechanical, and utility systems. He has served as design engineer, report writer, project manager, project director, program manager, construction manager and QA/QC officer on water and wastewater treatment systems with project costs ranging from \$2 million to \$100 million. In addition, he has considerable experience with Title 22 water recycling and cogeneration projects.

### **James Pollock, PE**

#### *Civil/Mechanical Design*

James has five years of varied experience in civil, structural, and water/wastewater engineering. His broad background includes experience with a variety of municipal water/wastewater treatment, collection, and distribution systems, California Water Project structures, and geographic information system design. He is an expert CAD operator, has prepared technical specifications, and prepared permit applications.



### **Greg DeBois, PE**

#### *Electrical / Controls Design*

Greg's experience includes start-up and operations support functions and control systems designs for wastewater and wastewater. He has completed pump station rehabilitation projects and generator installation/replacement tasks, working closely with utilities when service upgrades are needed. Greg has worked in both electrical and instrumentation lead roles on design and construction management.

### **Clayton Cheng, PE**

#### *Structural Design*

Clayton has over 10 years of structural engineering experience focusing on water and wastewater treatment plants, pumping stations, tunnels, and pipelines. He is familiar with building codes and has extensive experience with structural engineering software. Clayton has engineered concrete structures, masonry and metal buildings, steel structures, and extensive foundation design.





## UNDERSTANDING & APPROACH

### PROJECT UNDERSTANDING

The County of Santa Cruz Department of Public Works is looking to construct a new tertiary treatment facility, located at the Boulder Creek Sewage Treatment Plant (Plant) in County Service Area No. 7. The facility upgrade will provide seasonal disinfected tertiary recycled water for use at the Boulder Creek Golf Course and County Club. Tertiary effluent water quality is governed by the California Department of Health Services and the Regional Water Quality Control Board (Regional Board). We understand that the golf course's use of disinfected tertiary water will vary seasonally, such that the County will use existing leach fields when the golf course is not taking water.

LEE & RO visited the site of the Boulder Creek Plant on May 4, 2007 and interviewed County operations staff regarding current operations and anticipated needs. We understand that the facility was constructed around 1973 and consists of the following major components:

- Operations building housing two centrifugal air blowers including one standby unit, two air compressors including one standby unit, electrical and control equipment, chemical storage facilities, and a standby engine generator
- 50,000 gallon covered steel influent flow equalization tank
- Influent grinder and piping
- Steel package circular activated sludge treatment unit containing an internal secondary clarifier and waste activated sludge (WAS) holding tank
- Abandoned granular media Volcano® tertiary filter with HDPE storage tank, formerly used as a chlorine contact tank
- Effluent pump station, consisting of a prefabricated concrete sump containing two submersible pumps and valves



Under current operations, local residential wastewater is pumped through the grinder to the equalization basin, and flows through the treatment facility by gravity before ultimately reaching the effluent pump station. From the effluent pump station, water is pumped through multiple downstream pump stations before discharge to a leach disposal field. WAS is thickened on site and hauled off on a weekly basis, for disposal at another County wastewater facility.

The Plant operates under Waste Discharge Requirements (WDRs) Order No. 01-034 issued by the Regional Board. No disinfection of effluent currently occurs. Average daily flow is approximately 40,000 gallons per day (gpd), with peak wet weather flows nearing 100,000 gpd due to wet weather dependent infiltration and inflow (I/I). The facility is not staffed on a 24 hour, 7 days a week basis, and is inspected daily and maintained by Public Works staff.

The existing Volcano® filter and chlorination system are not currently in service. The filter was operated for a period of four to five years before being abandoned. Operations staff report that the filter did not operate successfully without significant manual involvement. Plugging was a routine problem, with maximum flows unable to exceed 40 gallons per minute (gpm). Multiple granular media materials were tried, with limited success in reducing filter plugging.

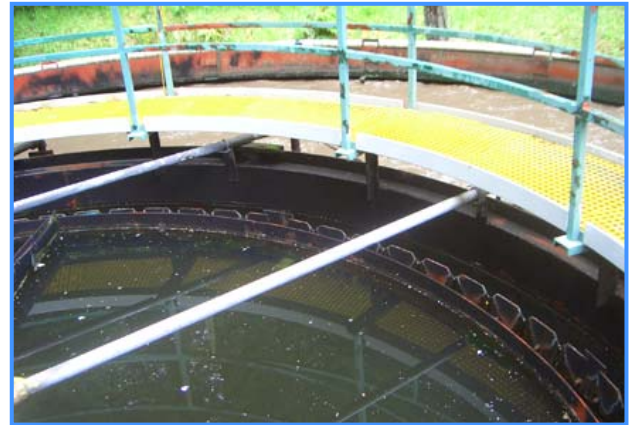
The overall treatment site is paved and sits on a relatively steep slope with access provided by one entrance gate and available space to expand the facility appears limited. The general condition of the facility appears good, given the age of the plant. However, much of the equipment is over 30 years old and the remaining life cycle of this equipment is uncertain.





## PROJECT APPROACH

During our site visit, we learned that the overall project is undefined at this time and that the first task, or Phase 1 of the work, will be to prepare a Preliminary Engineering Report that will set the scope of work for the remainder of the project. The following section provides a brief summary of items to be covered in this initial phase of work. Upon completion of these project elements, the project will be more clearly developed will be developed.



### PHASE 1 – PRELIMINARY ENGINEERING REPORT

LEE & RO will write a Preliminary Engineering Report (Report). This Report will be used as a basis of design. We will work closely with the County operations and engineering staff, and with the local community, to develop up to three project alternatives. These alternatives will then be evaluated based upon feasibility, preference of staff and residents, and capital and operational costs. Cost will be assigned to risk factors associated with the feasibility of each alternative, and the report will conclude with the recommendation of the alternative with the lowest overall project cost.

The Report will clearly document each project alternative, assumptions made, costs, and conclusions. Below is a listing of key elements of the Report and our initial recommendations that should be addressed during preparation of the initial document.

**Regulatory Requirements.** LEE & RO will provide a description of the requirements and limitations for using disinfected tertiary water (2.2/100ml coliform, and less than 2 NTU). It is important that the local golf course understand the limitations and requirements associated with this type of water and we will work with the County to facilitate communication throughout the project. We will document requirements, including:

- minimum setbacks from housing
- runoff limitations
- storage requirements
- hours of operation
- public access limitations, and
- monitoring requirements.



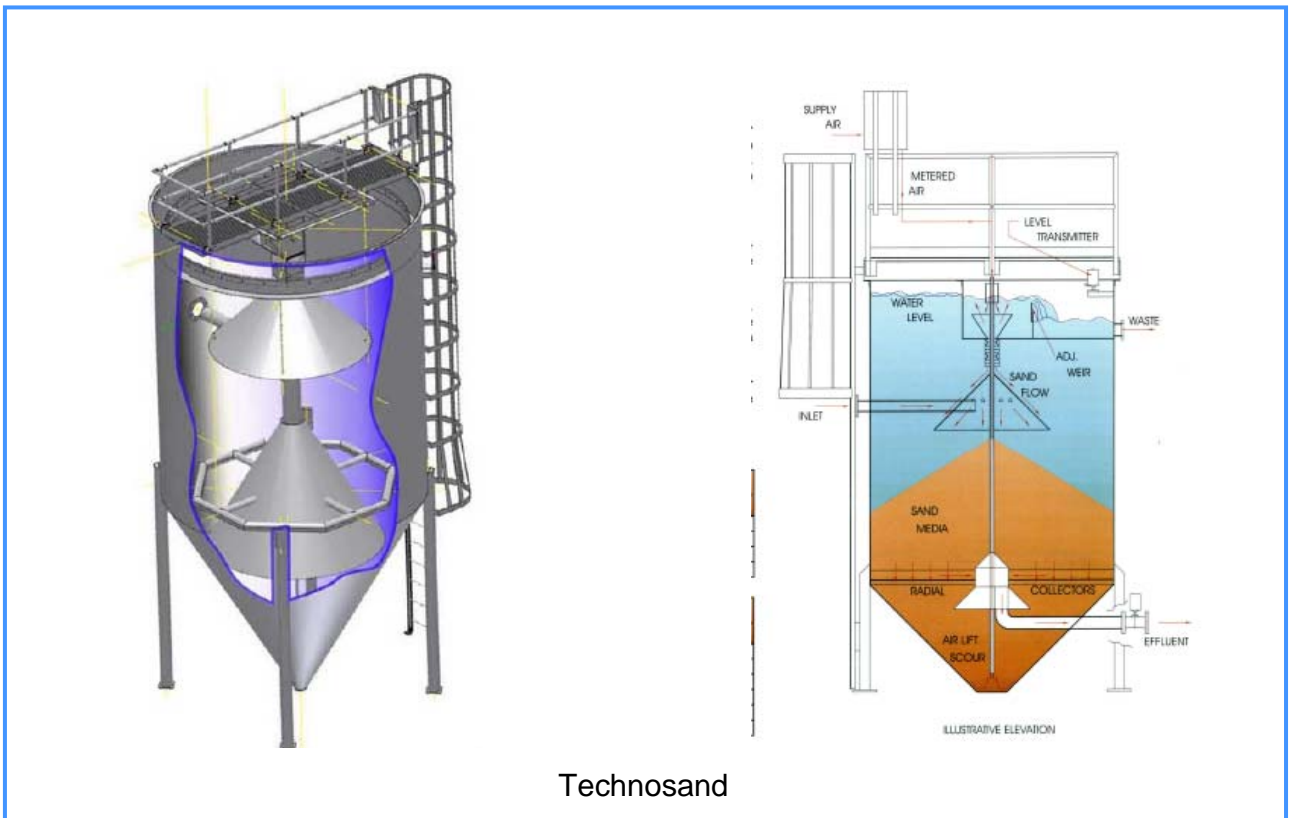
**Design Parameters.** Our team will work with staff to establish clear design parameters for the project. We initially recommend that the tertiary system be designed for peak wet weather flows, eliminating concerns of operations staff needing to discharge both secondary and tertiary effluent. This recommendation should not pose a significant problem since the peak flow is approximately 70 gpm, which is less than most of the smallest filter units made by State approved filter manufacturers. Backwash waste from the filter can be pumped to the existing equalization tank for additional treatment.



**Process Selection.** There are many tertiary filtration systems approved by the Department of Health Services (DHS). The current California DHS *Treatment Technology Report for Recycled Water* dated January 2007 lists 20 approved suppliers of filter systems, not including membrane systems. We will work with the County to narrow this list to the most promising technologies for evaluation in the Report. One example of a cloth filter is the Siemens Hydrotech®. An example of an alternative media system is the Schreiber Water Fuzzy Filter®. The most common type of tertiary filters utilize a granular media. Common types of granular media filters include the Parkson Dynasand®, Westech Technasand®, and Siemens Hydroclear® systems. LEE & RO team members have extensive experience with several of these systems and can provide insight into which systems are likely to be most effective for this application. We will also evaluate membrane systems, though we do not believe they will be practical for this application because of the cost and high energy demand associated with these units.



Dynasand®,





**Redundancy.** We recommend that the County consider not including a redundant filter system because of the added cost and the current ability to discharge flow to the leach fields in an emergency. However, we recommend that the County give strong preference to filter units that continuously backwash rather than those requiring intermediate shutdown during the backwash cycle such as the Fuzzy Filter®. The continuous backwash process will minimize the need for a temporary secondary effluent holding tank during backwash periods.

**Physical Requirements.** A tertiary filter does not have to be located at the existing Plant facility and it is possible to build the filter at another site. Optimum location of the new facilities will be investigated during the Report phase of the work.

**Disinfection Needs.** Disinfection will be required, with current requirements being for a minimum of 90 minutes of contact time during peak flow. A chlorine contact unit will be needed for proper disinfection unless ultraviolet light is used as the primary disinfection system. LEE & RO recommends that the County consider a pre-manufactured FRP tank with internal baffles for use as a chlorine contact tank. A minimum 6000 gallon tank would be required at a peak flow of 70 gpm. A disinfection residual will also be required, and we propose to investigate disinfection systems that use chlorine. Given the size of the facility and chemical hazards, we typically recommend the use of sodium hypochlorite.

**Packaged Systems.** To simplify the design and maximize economy, we recommend that the County look at constructing a system that is fully integrated and supplied by one manufacturer. This system can be “skid mounted” and include the filter, chemical coagulate system, flash mixer, control systems, valves and piping, and all necessary control instruments.

**Electrical System.** We were unable to investigate the existing electrical and control systems during our site visit, so we are unable to comment on the adequacy of these systems at this time. Our experienced electrical and instrumentation group is led by Greg DeBois, who is located in Northern California, and who has extensive knowledge of design and retrofit of these types of facilities.

**Effluent Pumping.** The County proposes to use the same existing effluent pump station and pipeline for both the tertiary effluent and the secondary effluent and this appears to be how the facility was operated when the Volcano® filter was in service. Under this scenario, the effluent pump station would change seasonally from tertiary flow to secondary effluent. This practice does not appear to comply with DHS requirements and will be evaluated during the Report process. Our understanding is that a separate system will be required, potentially requiring that a second pipeline and possibly pump station be constructed as part of this project. One possibility for avoiding this requirement is to upgrade all effluent from the plant to disinfected tertiary effluent year round, thus eliminating the need for a second distribution system for the tertiary effluent delivered to the golf course and reducing impacts to the shallow groundwater system around the existing leach field.

We will work with the Public Works staff during contract negotiations to further refine our project approach and we will develop a detailed scope of work including fee estimate and schedule during negotiations.

## PHASE 2 – DESIGN DOCUMENTS

To be determined upon completion of Phase 1.

## PHASE 3 – BID PERIOD SERVICES

To be determined upon completion of Phase 1.

## PHASE 4 – SUPPORT SERVICES DURING CONSTRUCTION

To be determined upon completion of Phase 1.





## **ROBERT O. GODWIN, PE**

### ***Project Manager***

Bob Godwin has nearly 20 years of engineering experience in the areas of water and wastewater, infrastructure and municipal facilities planning and design. He has supervised and completed design of numerous public works project and his project experience has ranged from wastewater treatment and collection, pumping stations, treatment systems design, and computer modeling. Mr. Godwin has been involved feasibility studies, preliminary design reports, plans & specifications, construction estimates for wastewater collection/treatment/reclamation projects. His experience includes cost estimating, detailed utility searches. Mr. Godwin has been responsible for field investigation and documentation, utilities coordination, design layouts, plan preparation, quality control, and design discipline coordination.

### **Registrations, Certifications, and Licenses**

Professional Engineer, California, C48045

### **Education**

B.S., Civil Engineering, California State Polytechnic University

### **REPRESENTATIVE PROJECT EXPERIENCE**

**Wastewater Treatment Plant Expansion, Patterson, California.** Mr. Godwin was Project Manager for a 1.25 MGD, \$15 million expansion of the city's wastewater treatment facility. The new activated sludge treatment system included an extended air oxidation ditch, 80-foot circular clarifier, three aerobic digesters, RAS pump station, plastic media sludge drying beds, polymer chemical feed systems, influent climber screen, influent grinder structure, effluent pump station, 4000-foot effluent pipeline, and 30-acres of percolation ponds. The system was designed to meet strict nitrogen removal requirements while simultaneously minimizing power consumption and sludge production through DO control.

**City of Patterson Wastewater Treatment Plant Rehabilitation, Patterson, California.** Mr. Godwin was Project Manager for a \$1 million upgrade and rehabilitation of the plant's existing activated sludge treatment system. The project included replacement of the oxidation ditch's two brush aerators, two new submersible banana blade mixers, replacement of the RAS pump station's three pumps, new effluent pump, and a 500-foot long horizontally drilled effluent pipeline.

**City of Angels, Wastewater Treatment Plant Expansion, City of Angels, California.** Bob was Project Manager for a \$6.5 million expansion of the City of Angels wastewater treatment plant. The expansion included the construction of a 3 million gallon lined equalization basin, one additional SBR basin, two aerobic digesters, chlorine contact basin, and plastic media sludge drying beds. The two existing SBRs as well as the new SBR were fitted with DO control to save power and provide nutrient removal. The chlorine contact tank was designed to the Title 22 requirements. Site constraints created the need for creativity in design, construction and operation. The expansion increased the capacity of the facility to 0.6 mgd with a peak flow capacity of 1.9 mgd.

**Storm Water Management and Pump Station Design, Sacramento Regional County Sanitation District, Elk Grove, California.** Mr. Godwin was Project Manager for a \$7 million upgrade to the stormwater pump station located at the Sacramento Regional Wastewater Treatment Plant in Elk Grove, California. Pre-design included a drainage study of the 140 acre facility, hydraulic analysis of the stormwater collection system and an evaluation of the existing mechanical and electrical equipment at the pump station. The design included approximately 2000-feet of 36-inch HDPE forcemain, new outfall structure, and a stormwater detention basin. Mechanical improvements to the pump station included low flow jockey pumps and replacement of the ventilation system in the wetwell and dry pit. Electrical upgrades included replacement of the existing electrical and control systems including switch gear, MCC, PLCs and construction of a new electrical building to house the equipment.



**Wastewater Treatment Plant Expansion – Phase II, Valley Sanitary District, Indio, California.** Mr. Godwin was Project Manager for a \$27 million upgrade to the District's pretreatment facilities and expansion of the plant's activated sludge system. The design included two 20 mgd vortex grit removal tanks, grit classifiers, four 170-foot long rectangular primary clarifiers, two anaerobic sludge digesters, two gravity belt thickeners, sludge pumping and a scum pump station. The Phase II expansion increased the plant's primary treatment capacity to 10 mgd.

**Wastewater Treatment Plant Expansion – Phase I, Valley Sanitary District, Indio, California.** Bob was Project Manager for a \$30 million upgrade to the District's activated sludge plant, including expansion of influent pumping station's capacity from 16 mgd to 28 mgd, three new 95-foot circular secondary clarifiers, two RAS/WAS pumping stations, replacement of three existing multi-stage blowers with more efficient single-stage compressors, new chlorine contact tanks, replacement of existing chlorine disinfection system with a hypochlorite/bisulfite disinfection/dechlorination system, two sludge dewatering belt-presses and solar drying beds. The Phase I expansion increased the plant's secondary treatment capacity to 10 mgd.

**Sump 119 Replacement Project. Sacramento Regional County Sanitation District, Sacramento, California.** Mr. Godwin was Project Manager for the design and construction of a 25 mgd sewage pumping station utilizing six variable frequency driven submersible pumps. The pumping station collects wastewater from four separate gravity inlet sewers ranging in size from 12 inches to 42 inches. Onsite odor control treatment and surge control were included in the station construction. Demolition of the original pumping station was completed after construction of the new station.

**Stormwater Pump Station Tactical Design, Sacramento Regional County Sanitation District, Sacramento, California.** Bob was Project Manager for the tactical design project for the existing regional treatment plant stormwater water pump station located in Elk Grove, California. The tactical design examined upgrade requirements, remaining facility useful life, and NPDES Industrial permit costs related to offsite discharge. A business case evaluation analysis of the project alternatives was performed to select the alternative with the highest benefit to cost ratio. This analysis considered the outcome and cost of NPDES compliance, potential offsite spills, and flooding risks to process equipment.

**On-Call Engineering Services for Wastewater Treatment, City of Lone, Lone, California**  
Bob is the Project Manager for on-call wastewater engineering services to the City of Lone 0.55 mgd secondary and 1.1 mgd tertiary treatment plants. These services include preparing a revised water balance; technical engineering support for the preparation of an EIR for a treatment facility expansion; and development of a Joint Powers Authority to manage wastewater effluent disposal. Future services will include preparation of an updated Wastewater Master Plan. This plan will focus on future water reclamation as well as treatment needs to meet current growth within the City service area. Current effluent disposal is accomplished by a combination of evaporation/percolation ponds and water reclamation.

**Emergency Storage Basin D (ESB-D), Sacramento Regional County Sanitation District.** Mr. Godwin was provided engineering assistance for the construction of this 25-million-dollar project located at the regional plant in Elk Grove, California. Responsibilities included review of contact submittals, representing the consultant engineer during construction meetings, management of subconsultants, performing field inspections, coordinating consultant efforts with the District's Project Engineering staff and the Resident Engineer staff.

**Grit System Modifications, Sacramento Regional County Sanitation District.** Bob was Project Engineer for study and design improvements of the grit removal and grit dewatering facility at the 200 mgd Regional Plant.



## **THOMAS J. BERGIN, PE**

### **Project Engineer**

Mr. Bergin has over 23 years of engineering and construction management experience in the areas of water and wastewater, infrastructure and municipal and commercial facilities. Mr. Bergin has supervised design and construction management, and has served as the engineer of record for numerous public works and commercial clients. Mr. Bergin's project experience has ranged from water supply, treatment, and distribution systems, tanks, reservoirs, and dams to municipal and industrial wastewater collection, pumping stations, and treatment systems.

#### **Registrations, Certifications, and Licenses**

Civil Engineer, California C48806, Nevada 014868  
General Engineering Contractor, California, A-585083

#### **Education/Training**

B.S., Civil Engineering, San Francisco University  
B.S., Agronomy, California Polytechnic University, San Luis Obispo

### **REPRESENTATIVE PROJECT EXPERIENCE**

**Algae Float Pump Station Upgrade Design Project, City of Sunnyvale Water Pollution Control Plant.** Tom supervised the design and construction engineering support for the project. The design included the automation of the existing treatment plants' algae float transfer process to the plants digester and wastewater ponds. Automation was achieved by incorporation of remote density, flow measuring equipment, automatic valving and extensive piping redesign within the treatment plant.

**Indian Springs Prison Wastewater Upgrade Project. Nevada State Public Works Board.** Mr. Bergin was Project Engineer for design and construction administration for this \$2,000,000 domestic wastewater facility expansion and upgrade project outside of Las Vegas, Nevada.

**Coal-Fired Power Plant Industrial Wastewater Facility Expansion, Nevada Power Company, Las Vegas.** Tom was Project Engineer for the facility expansion design. The project included a 40-acre treatment/evaporation pond, acquisition of a state dam permit, over one mile of underground wastewater pipelines, a corrosive wastewater pump station, a submerged mixer and peroxide injection treatment system, and a PLC based control and monitoring system.

**On-Site Sewage Disposal and Treatment System Designs for Several Lake Tahoe Ski Resorts** Served as the Design Engineer for these projects that involved sewage effluent disposal mounds and beds, sewage collection and effluent pipelines, wet wells and pumping systems, multiple 20,000 gallon capacity septic tank installations, and control and monitoring systems.

**Trunk Sewer Replacement Project, City of Sunnyvale.** Mr. Bergin served as the Project Manager and supervised the design for a 4,400 foot long 42 inch diameter replacement City trunk sewer. The \$4.7 million project included over 20 sewer junction structures and lateral connections along its route. The pipeline alignment also included a bore and jack section to pass beneath an existing light rail train track crossing, and required negotiation with an extensive array of existing utility crossings.

**Adeline Interceptor Relocation Project, East Bay Municipal Utility District (EBMUD).** Tom served as Project Manager and supervised the design for the relocation of a 60 inch wet weather sanitary interceptor sewer. The project included the coordination and inclusion of several parallel utilities and a difficult jack and bore section of pipeline beneath multiple UPRR train tracks. The sewer design included multiple large junction structures to tie-in to existing 20 foot deep, 60 inch diameter sewers at each end of the relocated segment.





**Lawrence Trunk Sanitary Sewer Manhole Rehabilitation Design Project, City of Sunnyvale.** Mr. Bergin managed the inspection and reporting and the detailed rehabilitation design of 73 City manholes and a sanitary lift station on one of the City's major sanitary sewers. The work involved the nighttime video and visual inspection of the 50+ year old facilities that were located within a major county expressway. The inspection work was summarized into reports and a remedial design was prepared addressing manhole defects and providing a detailed design for the extension of the service life of the project manholes. The design additionally included the rehabilitation design of the Arques submersible lift station.

**Kifer Lift Station, City of Sunnyvale.** Tom was the project Engineer responsible for the preparation of a preliminary design report, plans, construction cost estimates, and construction schedules, and he provided construction support services during bidding and permit acquisition services for a 450 gpm capacity wastewater pump station which included conversion of an existing Smith & Loveless package pump station to a new submersible pump station. The new pump station consisted of two 450 gpm submersible pumps (@ TDH of 22 feet) driven by 5-horsepower motors, new electrical controls and sensors, and conversion of the existing dry-pit portion of the pump station to a new wet well.

**Arques Lift Station, City of Sunnyvale.** Mr. Bergin conducted a condition assessment, then design the mechanical retrofit for this sanitary sewer submersible pump station. Work included replacing mechanical and electrical equipment within an existing wetwell, and coordinating operations with the City's new SCADA system.

**Stormwater Pumping Stations No. 1, No. 4 and No. 6, Mission Bay Project, San Francisco, California.** Tom was involved in the design and construction management of three project storm water pump stations that discharge filtered stormwater to the San Francisco Bay. Tom served as Project Manager and supervised the design for the 85 CFS Pump Station No. 6 which included a submersible pump wetwell and associated control and emergency generator building. Mr. Bergin supervised and personally completed the final design effort for the 95 CFS Pump Station No. 4, and is currently providing construction management assistance. For the 50 CFS Pump Station No. 1, Mr. Bergin provided the project construction engineering support.

**East Bayshore Recycled Water Retrofit Project, EBMUD.** Mr. Bergin produced the primary design and feasibility studies for conversion of over 30 existing irrigation customer sites to recycled water use for this Northern California Water Supplier. The Primary design documents required design of the initial routing of water services, the identification of potential cross-connection locations, and the specification of design components to ultimately achieve two separated water systems.

**Freeman Diversion Improvement Project, United Water Conservation District.** Tom served as Resident Engineer for the \$30M project in Santa Paula, California. The project involved construction of a 1,200 foot long, 133,000 cubic yard roller compacted concrete (RCC) dam (California's first), construction of a river diversion headworks, an extensive canal network, and construction of numerous appurtenant project components.

**Santa Clara and Santa Cruz County Mutual Water Company Water System Designs.** Supervised design and construction management for three mutual water company water distribution systems with typical fire flow requirements of 2,000 gpm. Project features included water source securement, a transmission, storage, and distribution network. Special project features included cross-country, roadway and high pressure pipelines, multi-stage pumping systems, seismically active, limited area storage tank sites, FEMA funded projects.



## **CHRISTINE LINDOW, PE**

### ***Principal-In-Charge***

Christine Lindow has over 23 years of experience in the design of water/wastewater infrastructure facilities, project management and technical project execution. Her wastewater design experience includes headworks facilities, screenings and grit handling structures, filters, clarifiers, thickeners, chemical spill containment structures, oil/water separation structures, operations buildings, activated sludge treatment facilities, bulk chlorine storage structures, recycled water storage and distribution infrastructure. She has project management experience and has led a variety of projects including water storage and distribution, and alternative methods of project delivery such as design-build.

Ms. Lindow has extensive resource management experience, having managed complex multiple Task Order contracts with design fees up to \$2.5M. She has been responsible for resource pools of up to 100 professionals, and has managed and led projects with up to thirteen partner or specialty subconsultant firms.

**Registrations, Certifications, and Licenses**  
California Professional Engineer - Civil, 38780

**Education/Training**  
General Manager Program, Harvard Business School  
BS/BSc, Civil Engineering, University of the Pacific

### **REPRESENTATIVE PROJECT EXPERIENCE**

**Main Wastewater Treatment Plant, Fairfield Suisun Sanitation District.** Ms. Lindow served as resident engineer for an expansion at the Fairfield-Suisun Sanitation District's Main Wastewater Treatment Plant. Responsibilities included review of Contractor progress payments, completing daily progress logs, reviewing submittals, and responding to requests for clarification of the contract documents.

**New Wastewater Treatment Plant, City of Vacaville.** Ms. Lindow served as a member of the Value Engineering Team tasked with looking at ways to reduce the capital cost of constructing Vacaville's new Wastewater Treatment Plant by \$9M - \$10M. Options considered included rehabilitation and reuse of abandoned process units, revised construction techniques, and evaluation of capacity needs.

**Main Wastewater Treatment Plant Wet Weather Expansion, East Bay Municipal Utility District.** Ms. Lindow was the lead structural engineer for the design of the East Bay Municipal Utility District's (EBMUD) Main Wastewater Treatment Plant Wet Weather Expansion, with an estimated construction cost of \$40 million, consisting of a masonry building rehabilitation and expansion, and modification of pumping facilities.

**Calera Creek Wastewater Treatment Plant, City of Pacifica.** Ms. Lindow was the lead structural engineer for the Calera Creek WWTP in Pacifica, CA. Facilities include SBR tanks, UV disinfection, filtration, solids handling, ATAD, and administrative offices. The treatment plant was built into the side of a hill, resulting in unbalanced retaining loads on the mostly buried facilities.

**Eagle River Wastewater Treatment Plant, Anchorage Water and Wastewater Utility.** Ms. Lindow coordinated and designed all structural facilities for the expansion of the Eagle River Wastewater Treatment Plant while working in Montgomery Watson's Anchorage, Alaska office. This plant is totally enclosed in pre-engineered metal structures, which were designed to accommodate the high snow loads anticipated in this area.

**Wastewater Treatment Plant Expansion, Broward County Office of Environmental Services.** Ms. Lindow was the lead structural engineer for an expansion of the Broward County, Florida, North Regional Wastewater Treatment Plant Expansion. The construction cost of this project was over \$50 million, including partially reinforced masonry pump stations, and



large concrete process units. Work included coordination with a Joint Venture partner on the project, as well as oversight of work completed by a local structural subconsultant.

**Recycled Water Reservoir and Pump Station, Dublin San Ramon Services District.** Ms. Lindow managed the siting, design and office services during construction for a recycled water reservoir and pump station for the Dublin San Ramon Services District. Key elements of the project included hydraulic modeling, site selection and property acquisition, environmental documents, coordination with City of Dublin and developer staff, and design of the facilities, within a very tight schedule window.

**Cypress Relocation Project, East Bay Municipal Water District.** Ms. Lindow was the project manager for the East Bay Municipal Utility District Cypress relocation project, which involved realignment of water system piping in the vicinity of the San Francisco Bay Bridge approach. The project included use of jack and bore technology, coordination with Caltrans and other agencies, and use of controlled low strength backfill in bay mud.

**Fairview Walpert Pressure Zones Improvements, East Bay Municipal Water District.** Ms. Lindow managed the design of two reservoirs and two pumping plants for East Bay Municipal Water District at the Five Canyons development in Castro Valley. The Fairview Walpert Pressure Zones Improvements project required significant coordination of efforts by 5 subconsultants and an independent property developer, while completing the design within unusually short time constraints.

**Reservoir and Pipeline Project, City of Vallejo.** Ms. Lindow was Project Engineer/Project Manager for a reservoir and pipeline project at Mare Island. The project was extremely fast-track due to grant funding requirements, with pre-design and production of contract documents completed within 90 days. The project included significant sitework, public acceptance, SHPO approvals, coordination with the Navy, corrosive soils, and steep slopes on inlet/outlet piping.

**Saltwater Intrusion Project, City of Castroville.** Ms. Lindow managed the design document production for the City of Castroville's saltwater intrusion project, including several miles of medium to larger diameter HDPE pipeline.

**South Airport and Battle Creek Pump Stations, City of Salem.** Ms. Lindow was responsible for design oversight for the City of Salem Pump Station Project. The project involved the South Airport Pump Station with a capacity of 32.3 mgd, and the Battle Creek Pump Station with a capacity of 11.6 mgd.

**Treated Water Pump Station, City of Everett, Washington.** Ms. Lindow designed a new Treated Water Pump Station. The project also included design of upgrades to the existing pump station and interconnections to the existing WTP and reservoir, as well as design of several hundred feet of 84-inch diameter pipeline. The pump station is pile-supported as a liquefaction potential mitigation measure. The existing pump station has four 250 hp pumps and the new facility has seven 400 hp pumps for a combined capacity of 175 mgd.

**50 mgd Joe M. Steele Water Treatment Plant, Fayetteville, Arkansas.** Ms. Lindow was the lead structural engineer for the design and construction of the 50 mgd Joe M. Steele Water Treatment Plant in Fayetteville, Arkansas, with construction cost of \$30 million. The project included numerous large hydraulic structures and ten specified pre-engineered metal buildings, as well as a partially buried rectangular multi-cell reinforced concrete reservoir.

**100 mgd Santa Teresa Water Treatment Plant, Santa Clara, California.** Ms. Lindow designed the majority of the facilities, and provided construction services for the \$50 million, 100 mgd Santa Teresa Water Treatment Plant in Santa Clara, California, including a large masonry operations center, filters, backwash facilities, and chemical containment structures.





## **M. STEVE RO, PE**

### **Technical Advisor**

M. Steve Ro has over 35 years of engineering, construction, and project management experience with water and wastewater pumping, collection, distribution, treatment, reclamation, and reuse facilities. As a founding partner of LEE & RO, he has extensive experience with design review, construction management, design-build, and project management. Additionally, he has considerable design background in electrical, instrumentation and plant automation systems engineering.

#### **Registrations, Certifications and Licenses**

Professional (Civil) Engineer, CA #C25010  
Diplomat, American Academy of Environmental Engineers  
General Engineering Contractor, CA, #681020 (Haz)

#### **Education/Training**

M.S. Sanitary Engineering, U.C. Berkeley  
B.S. Civil Engineering, Seoul National University

### **REPRESENTATIVE PROJECT EXPERIENCE**

**Wastewater Treatment Plant Expansion and Rehabilitation Projects, Orange County Sanitation District.** Since 1979, Steve has been Project Manager and/or Principal-In-Charge for numerous plant expansion and rehabilitation capital improvement projects (with an aggregate construction value of over \$150 million) for 176 mgd Plant 1 and 274 mgd Plant 2. Representative projects include the \$40 million, 60 mgd primary plant expansion at Plant 1; a \$12 million primary clarifier addition & rehabilitation project at both Plants; a \$10 million anaerobic digester rehabilitation project at Plant 2; a \$2.2 million odor scrubber modification project at both Plants; a \$6 million pure oxygen activated sludge process upgrading at Plant 2; and the \$4.5 million headworks/grit removal facility rehabilitation at Plant 1.

**Headworks and Grit System Improvements, Point Loma Wastewater Treatment Plant, City of San Diego.** Mr. Ro was Project Director for a \$21 million headworks improvements project, which included two new grit tanks, a new grit processing and dewatering building, foul air collection and odor control facility, new agitation blowers, and chemical systems for advanced primary treatment.

**Long Beach and Pomona Water Reclamation Plants, LA County Sanitation Districts.** Steve was Project Director for designing conversion of the chlorine/sulfur dioxide systems into sodium hypochlorite/sodium bisulfite chlorination/dechlorination facilities at the 25 mgd Long Beach and 13 mgd Pomona Water Reclamation Plants.

**Tertiary Filtration and Recycled Water Pumping Stations, Water Reclamation Plant No. 10, Coachella Valley Water District.** Mr. Ro served as Project Director for a \$11 million project to add 5 mgd filtration (DynaSand) to the existing 10 mgd Title 22 tertiary plant, 10 mgd chlorine contact tank, new chlorine building, 5 million gallon reservoir, a 13 mgd high head and 18 mgd low head recycled water pump stations, and a new electrical substation with 12 kV loops and motor control centers. High head pumping station consists of four (4) 500 hp pumps (each rated 3,000 gpm at 410 feet head) and low head pumping station consists of four (4) 250 hp pumps (each rated 4,000 gpm at 250 feet head). All pumps are driven through variable frequency drives (VFDs).

**Oxnard Wastewater Treatment Plant, City of Oxnard.** Steve was Project Engineer for the liquid process and Project Manager for the solids process for a 25 mgd, \$20 million plant improvement project, which included headworks, influent pumping, trickling filter secondary, chlorination/dechlorination, anaerobic digestion, effluent pumping, sludge dewatering, and a biological odor control facility.

**Hyperion Treatment Plant Improvements, City of Los Angeles.** Mr. Ro directed design studies and prepared plans and specs for improvements at the 420 mgd wastewater treatment



plant: upgrading of headworks; chemical storage and feeding systems (for ferric chloride, polymer, and ferrous chloride) for primary plant and anaerobic digesters; structural renovation to primary sedimentation tanks; prechlorination; and chlorine scrubber addition.

**Water Reclamation Plant No. 4 Expansion, Thermal, Coachella Valley Water District.**

Steve was Project Director for a \$13 million plant expansion project consisting of a new 10 mgd chlorination and dechlorination facility, addition of 3 mgd activated sludge secondary plant with total plant capacity 10 mgd, gravity belt sludge thickening and belt press dewatering facility, a sludge truck loading facility.

**Lompoc Advanced Wastewater Treatment Facility, Lompoc.** Mr. Ro was Project Manager for design and construction of a 5 mgd, \$14.6 million coupled trickling filter-activated sludge plant with chlorination and dechlorination, sludge thickening, anaerobic digestion, digester gas fueled engine-driven blowers, and an odor control facility.

**Water Treatment Plant Improvements, Skinner Filtration Plant, Metropolitan Water District of Southern California.** Steve was Project Director for design of a large chemical tank farm, chemical feeding systems, and a new chlorine building with chlorine containment and scrubber for a 750 mgd capacity water filtration plant. The chemical system included sulfuric acid, hydrogen peroxide, caustic, and calcium thiosulfate for the ozone pretreatment facility.

**Chemical Containment Systems and Facility Improvement Projects, Metropolitan Water District (MWD) of Southern California, Los Angeles, California.** Mr. Ro was Project Manager for a comprehensive evaluation and final design improvements for the MWD facilities for storage and handling of hazardous materials and chemicals, including chlorine, ammonia, polymer, alum, caustic, and acids. This evaluation inventoried the chemicals stored and handled at the 500 mgd Weymouth and 700 mgd Jensen Filtration Plants, four reservoirs, and eight power plants.

**Goldsworthy Desalter, Water Replenishment District of Southern California.** Steve was Project Director for design and construction support services for the \$8 million, 2,100-gpm Goldsworthy Desalter Facility in Torrance, which employs two reverse osmosis treatment trains. The project also included raw water, product water, brine disposal pipelines, and extensive chemical handling systems.

**El Segundo Water Recycling Plant, Phase III Expansion (Chevron Boiler Feed Water), West Basin Municipal Water District.** Mr. Ro served as Project Director for preparation of preliminary design report and 35% design documents for competitive design-build procurement for a \$17 million water reclamation/recycling facility. The process included 5 mgd microfiltration and reverse osmosis (RO) trains and two product water pumping stations comprised of high head and low head VFD driven pumps.

**Water Reclamation Plant, City of Beaumont.** Steve served as Project Director for study, design, and construction service for a 1.5 mgd, \$4.5 million plant to produce Title 22 reclaimed water and to comply with the stream discharge criteria (total nitrogen limit of 10 mg/l). The plant included single-sludge aeration basins, secondary clarifiers, filters, and ultraviolet (UV) contactors.

**Various Wastewater Pumping Station Upgrades, City Los Angeles.** Mr. Ro was Project Director for upgrading nine (9) wastewater pumping stations. Upgrades included air ventilation; replacement of pumps, motors or variable speed drives; electrical system improvements for upsizing or code compliance; and access & structural improvements.



## **DONALD R. LEE, PE**

### **Technical Advisor**

Don Lee, one of the two founding principals of the firm, brings more than 35 years of water and wastewater systems engineering and project management experience to this assignment. Mr. Lee, who is registered as both a civil and mechanical engineer in the State of California, has extensive experience with wastewater process feasibility studies, treatment process selection, conceptual design development, final detailed design, life-cycle cost analyses, operation and maintenance evaluations, value engineering, project and construction management, and project quality assurance.

#### **Registrations, Certifications, and Licenses**

Registered Civil Engineer, CA #17723

Registered Mechanical Engineer, CA #20950

#### **Education/Training**

MS Environmental Engineering, Northwestern University

BS Civil Engineering, Northwestern University

### **REPRESENTATIVE PROJECT EXPERIENCE**

**Tertiary Wastewater Treatment Plant, City of Stockton, California.** Mr. Lee was Project Manager for design of the 55 mgd, \$19 million, tertiary filtration plant consisting of influent pumping, dissolved air floatation (for algae removal), dual media filtration, chlorination, and effluent pumping by siphons.

**Wastewater Treatment Plant, City of Patterson.** Don was Project Director responsible for design, construction support, and resident engineering services for the \$5 million expansion of the City's Wastewater Treatment Plant. The upgraded plant included influent headworks, a 0.5 mgd advanced integrated pond system (AIPS), 7 percolation ponds, a 33-inch interceptor sewer, and effluent pump station. The project also included groundwater monitoring with construction of five new monitoring wells.

**Water Reclamation Plant, City of Angels.** Mr. Lee was Project Director for design services for \$3.5 million, 0.5 mgd (2.9 mgd peak flow) activated sludge "SBR" plant. The design included modification of most plant processes including headworks, secondary process, filters, chlorine contact tanks, sludge handling processes, chemical handling, new blower building, and effluent pumping station.

**Headworks and Sludge System Improvements, Treatment Plant No. 1, Orange County Sanitation District.** Mr. Lee was Project Manager for an influent pumping station expansion from 90 to 140 mgd; rehabilitation of aerated grit removal tanks; structural tank modifications process the increased flow of 140 mgd; and modifications to anaerobic Digester 5 and 6. The digester project included sludge and digester gas piping modifications, replacement of sludge recirculation pumps and heat exchangers, addition of steam piping, supernatant collection boxes and piping, and installation of moisture and flame traps.

**Headworks and Aerated Grit Removal Facility Modifications and Improvements, Point Loma Wastewater Treatment Plant, City of San Diego.** Mr. Lee served as Project Director for a \$21 million plant improvement project consists of new grit dewatering and loading building, addition of two aerated grit removal tanks, modifications to four existing tanks, installation of redundant slurry piping, addition of grit slurry pumps, modifications to odor control systems, new grit classifiers and storage bins, new agitation air compressors, utility water piping, electrical modifications, and control system improvements.

**Water Treatment Plant Improvements, Skinner Filtration Plant, Metropolitan Water District of Southern California.** Don was Project Manager for design of a large chemical tank farm and chemical feeding systems and a new chlorine building with chlorine containment and





scrubber for a 750 mgd capacity water filtration plant. The chemical system includes sulfuric acid, hydrogen peroxide, caustic, and calcium thiosulfate for the ozone pretreatment facility.

**Anaerobic Digester Improvements, Point Loma Wastewater Treatment Plant, City of San Diego.** Mr. Lee was Project Manager for preliminary design, design and construction services for \$12 million renovation and improvements to three 125-foot diameter anaerobic digesters, including a new sludge heating systems, sludge and digester gas piping, new digester mixing systems, new digester covers and structural improvements. Project required extensive field investigation for pipe routing, constructibility analysis.

**Wastewater Treatment Plant, City of Oxnard, California.** Don was Project Director for design and construction management for a 25 mgd, \$21 million plant project consisting of influent & effluent pump stations, 25 mgd trickling filter secondary, chlorination and dechlorination, two 90-foot diameter anaerobic digesters, sludge dewatering, and a 1,000 kW cogeneration plant with three ebulliently-cooled 500 kW Waukesha engine generators fueled by digester gas augmented by natural gas. Heat recovered is used for sludge heating.

**Lompoc Water Reclamation Plant, City of Lompoc.** Mr. Lee was Project Manager for this project which included design and construction management services of the \$15 million, 5 mgd water reclamation plant. The project included headworks and influent pumping, primary sedimentation, a coupled trickling filter-activated sludge secondary process, chlorination and dechlorination, effluent pumping, and two 65-foot diameter anaerobic digesters. Aeration blowers use digester gas as fuel and heat recovered from blower engines was used to heat the digesters.

**Anaerobic Digester Improvements, Hyperion Treatment Plant, City of Los Angeles.** Don was Project Manager for design studies and preparation of plans and specifications various digester improvements at the 420 mgd wastewater treatment plant. Project included new gas mixing and heating systems, modifications to sludge and hot water piping, new heat exchangers, and digester gas cleaning equipment. Project included extensive piping modifications inside pipe tunnels and digester control buildings.

**Expansion of Primary Treatment and Modification to Digesters, Encina Water Pollution Control Facility, Encina Wastewater Authority.** Mr. Lee served as Project manager for addition of primary clarifiers, scum collection and pumping, new sludge pumps and modifications to the sludge piping, skimmer modifications, modifications to existing anaerobic digesters, and addition of a centrifuge for dewatering of digested sludge.

**Grit System Improvements, Sacramento Regional County Sanitation District (SRCSD) Treatment Plant.** Don was Project Director for pilot plant and model testing (to select optimum grit dewatering equipment), pre-design report preparation, and design for major rehabilitation and modification to aerated grit removal tanks, grit slurry piping, and grit separation and washing and grit transport system at the 200 mgd SRCSD Plant.

**Wastewater Treatment Plant Expansion and Nitrogen Removal Facility, City of Blythe.** Mr. Lee served as Project Manager for design and construction support services provided for this \$6 million, 2.5 mgd plant expansion and nitrification & denitrification project. The project included new activated sludge units with circular secondary clarifiers, a new headworks, an aerobic digester; and upgrade/modification to sludge drying beds, and sludge and effluent pump stations.



## **GREG DEBOIS, PE**

### ***Electrical / Controls Design***

Mr. DeBois' experience includes 14 years as a Professional Engineer and 20 years working in the electrical/electronic industry. As a Professional Engineer, Greg has functioned as lead electrical engineer on numerous water and wastewater projects across the country. His experience also includes having worked as a distribution engineer for Pacific Gas and Electric in California. Mr. DeBois has a strong working knowledge of instrumentation, telemetry and control. He has worked in both electrical and instrumentation lead roles on design and construction management projects.

#### **Education**

B.S., Electrical Engineering, San Francisco State University

A.S., Electronics, Santa Rosa Junior College

#### **Registration**

Professional Electrical Engineer, California, #E14298; New Mexico, Idaho, Texas, Oregon

NCEES Registration Certification

### **REPRESENTATIVE PROJECT EXPERIENCE**

**Wastewater Treatment Plant Expansion, City of Pocatello, Idaho.** Mr. DeBois was lead electrical engineer for design and CM of a significant expansion at Pocatello's WWTP, including addition of digesters, clarifiers, and multiple pump stations.

**Wastewater Treatment Plant Expansion, City of Caldwell, Idaho.** Greg was responsible for electrical services during construction, including submittal review and intermittent site inspections.

**Hamilton Water Plant Reconstruction, City of Sunnyvale.** Greg is the electrical and control systems engineer for rebuilding of the pumping and control facilities at one of the City's well head treatment and distribution facilities. Work included hook-up of an on-site emergency generator.

**Pump Station Upgrades, Central Contra Costa Sanitary District.** Mr. DeBois is completing design of upgrades for four of the District's aging pump stations. Work included evaluation of existing systems, working with operations staff to determine best fit project needs, and completing the final design document preparation.

**Outfall Project, Central Contra Costa Sanitary District.** Greg was lead electrical engineer for this project that included 2,300v clean power VFD driven pump design.

**Sump 2 Upgrades Project, City of Sacramento.** This project involved design of 8 megawatts of power generation, double feed from SMUD, and paralleling switchgear for generation.

**Switchgear Replacement Project, City of Petaluma.** Greg was lead electrical engineer on a fast track 12kV switchgear replacement project at the City's treatment ponds. The work included upgrades to the outfall chemical facilities.

**Houston Area Water Company (HAWC) Project.** Greg was lead electrical engineer for this Design/Build/Operate contract. The electrical system features 138kV transmission, 12kV distribution, 4.16kV/480VAC utilization voltage. The plant also featured a 100% redundant power system and all substations were double-ended. High service pumps were powered at 4.16kV with reduced voltage starters and the raw water pump station utilized Variable Frequency Drives (VFD's) for control. The plant was sized for 40 MGD with future expansion to 80, 240 and ultimately 360 mgd.

**Willamette Water Treatment Plant, City of Wilsonville, Oregon.** Greg was lead electrical engineer for design of a new 25 mgd plant. Unique features of this project include Design-Build concept, medium voltage equipment and limited site space availability. The plant was a full



grassroots project, and during construction Greg worked closely with contractor including making frequent site visits. Facilities included plant inlet pump station, ozone generation and destruct units, chlorination, sand filters, high service pump station. A 1 mgd water feature alongside a park took output water and recirculated to create a waterfall alongside the plant site.

**Rogue Valley Council of Government Tap Water Project.** Greg was lead electrical and instrumentation engineer for this pipeline project which included a pump station, radio telemetry, and reservoir level signaling back to an existing SCADA system.

**Mission San Jose WTP Expansion, Alameda County Water District.** Greg provided construction management support for this major treatment plant expansion which included a generator building addition, chemical system improvements, and a chlorination facility.

**Water Treatment Plant Expansion, Beaver Water District, Arkansas.** Greg was responsible for electrical systems associated with chlorine injection at the main treatment plant expansion.

**Northwest Area Water Supply (NAWS) Project, North Dakota.** This major water supply project was delayed for several years while issues associated with United States and Canadian water rights were resolved. Project elements included lake intake pretreatment facilities, 45 miles of 30-inch and 36-inch diameter pipeline, pump stations, WTP modifications, and extensive SCADA design.

**Multi Purpose Pipeline Project, Contra Costa Water District.** Greg was lead electrical engineer for the predesign effort for the Randall Bold WTP pump installation, 4.16kV reduced voltage starters, WAPA (Western Area Power Authority) and PG&E coordination.

**Surface Water Treatment Facility, City of Fresno.** After serving as lead electrical engineer for design of this project, Greg performed site resident engineer functions with detailed involvement during the construction phase of the project. Design elements included medium voltage (MV) finished water pumps, low voltage (LV) VFD driven pumps, MV and LV power distribution around the site, and standby power generation.

**South Cordelia Pump Station and Reservoir, City of Fairfield.** Greg was lead electrical and instrumentation engineer for design of a rectangular buried multi-cell reservoir, data highway plus between the PLC at the reservoir and remote pump station site. Extensive coordination with PG&E and PacBell were needed.

**Spring Lane Reservoir No. 1, Marin Municipal Water District.** Design elements of this project that was delayed due to mitigation issues associated with the state and nationally protected Marin Dwarf Flax included addition of an emergency generator, retrofit of an aging pump station, and radio telemetry tie-in to existing control system.

**American River Pump Station, Placer County Water Authority.** Greg was lead electrical engineer for design of a new pump station pulling water from American River. Key project elements included permitting issues, pumps with MV motors, VFD's and reduced voltage starters, and an emergency generator.

**Reservoir Retrofit Project, City of Portland.** This project involving reservoir retrofit for security purposes was the result of reaction to terrorist activities after 9/11. Project elements included fabric covers for open reservoirs, addition and upgrades to pump systems, and automated control systems tie-ins.

**Fish Screen and Ladder, Ducks Unlimited.** Project elements included a brush cleaned fish screen and fish ladder, and a new VFD control panel.

**Pipeline Project, City of San Diego.** For this large diameter water supply pipeline conveyance system project, electrical work consisted of design of multiple pump stations, sophisticated automated controls, emergency power generation, and flow monitoring.





## **JAMES POLLOCK, PE**

### **Civil / Mechanical Design**

Mr. Pollock has five years of experience in providing planning, design, and construction support for civil, mechanical, treatment process, and structural design activities. His broad experience includes design of municipal potable water distribution system elements, wastewater treatment systems, wastewater collection and pumping facilities, and stormwater management systems. James is an experienced designer and CAD expert, with expertise in preparing contract drawings, technical specifications, technical reports, technical and administrative memoranda, and permit applications. He has prepared planning level reports and detailed final designs, and he has provided office and field support on construction projects.

#### **Registrations, Licenses, and Certifications**

Registered Civil Engineer, CA C70861

HAZWOPR 40-hour

HAZWOPER Supervisor Training

#### **Education/Training**

B.S., Civil Engineering (Water Resources and Structural Engineering)

University of California at Davis

### **REPRESENTATIVE PROJECT EXPERIENCE**

**Wastewater Treatment Plant Expansion, Patterson, California.** Mr. Pollock was Staff Engineer for a 1.25 MGD, \$15 million expansion of the city's wastewater treatment facility. The new activated sludge treatment system included an extended air oxidation ditch, 80-foot circular clarifier, three aerobic digesters, RAS pump station, plastic media sludge drying beds, polymer chemical feed systems, influent climber screen, influent grinder structure, effluent pump station, 4000-foot effluent pipeline, and 30-acres of percolation ponds. The system was designed to meet strict nitrogen removal requirements while simultaneously minimizing power consumption and sludge production through DO control.

**City of Patterson Wastewater Treatment Plant Rehabilitation, Patterson, California.** Mr. Pollock was Principal Designer for a \$1 million upgrade and rehabilitation of the plant's existing activated sludge treatment system. The project included replacement of the oxidation ditch's two brush aerators, two new submersible banana blade mixers, replacement of the RAS pump station's three pumps, new effluent pump, and a 500-foot long horizontally drilled effluent pipeline.

**City of Angels, Wastewater Treatment Plant Expansion, City of Angels, California.**

James was Project Engineer for a \$6.5 million expansion of the City of Angels wastewater treatment plant. The expansion included the construction of a 3 million gallon lined equalization basin, one additional SBR basin, two aerobic digesters, chlorine contact basin, and plastic media sludge drying beds. The two existing SBRs as well as the new SBR were fitted with DO control to save power and provide nutrient removal. The chlorine contact tank was designed to the Title 22 requirements. Site constraints created the need for creativity in design, construction and operation. The expansion increased the capacity of the facility to 0.6 mgd with a peak flow capacity of 1.9 mgd.

**Wastewater Treatment Plant Expansion – Phase II, Valley Sanitary District, Indio, California.**

Mr. Pollock was Project Engineer for a \$27 million upgrade to the District's pretreatment facilities and expansion of the plant's activated sludge system. The design included two 20 mgd vortex grit removal tanks, grit classifiers, four 170-foot long rectangular primary clarifiers, two anaerobic sludge digesters, two gravity belt thickeners, sludge pumping and a scum pump station. The Phase II expansion increased the plant's primary treatment capacity to 10 mgd.



**Wastewater Treatment Plant Expansion – Phase I, Valley Sanitary District, Indio, California.** James was Project Engineer for a \$30 million upgrade to the District's activated sludge plant, including expansion of influent pumping station's capacity from 16 mgd to 28 mgd, three new 95-foot circular secondary clarifiers, two RAS/WAS pumping stations, replacement of three existing multi-stage blowers with more efficient single-stage compressors, new chlorine contact tanks, replacement of existing chlorine disinfection system with a hypochlorite/bisulfite disinfection/dechlorination system, two sludge dewatering belt-presses and solar drying beds. The Phase I expansion increased the plant's secondary treatment capacity to 10 mgd.

**Storm Water Management and Pump Station Design, Sacramento Regional County Sanitation District, Elk Grove, California.** James was Project Engineer for a \$9 million upgrade to the stormwater pump station located at the Sacramento Regional Wastewater Treatment Plant in Elk Grove, California. Pre-design included a drainage study of the 140 acre facility, hydraulic analysis of the stormwater collection system and an evaluation of the existing mechanical and electrical equipment at the pump station. The design included approximately 2000-feet of 36-inch HDPE forcemain, new outfall structure, and a stormwater detention basin. Mechanical improvements to the pump station included low flow jockey pumps and replacement of the ventilation system in the wetwell and dry pit. Electrical upgrades included replacement of the existing electrical and control systems including switch gear, MCC, PLCs and construction of a new electrical building to house the equipment.

**New York Creek Lift Station, El Dorado Irrigation District, El Dorado Hills, California.** Mr. Pollock was design engineer for a new triplex wastewater lift station. The capacity of the pump station is 1300 gpm at 180-feet of head. This facility replaced the existing pump station which will be demolished upon completion of construction. Services during construction for this project included remedial work associated with under-strength concrete on the deep below-grade wetwell.

**Lawrence Trunk Sanitary Sewer Manhole Rehabilitation Design Project, City of Sunnyvale.** James evaluated the structural condition of 73 City manholes on one of the City's major sanitary sewers, including video and visual inspection of expressway facilities. He assisted in design of upgrades, after reviewing the inspection videos and logs. The contractor selected for this work commented that their price was very competitive, as this was the most complete and thorough set of plans they had bid.

**Meadowview Community Center, Implementation of Remedial Action Plan, City of Sacramento.** Mr. Pollock was Field Engineer for site remediation at this community services center, a site contaminated with gasoline and perchloroethylene (PCE). The Design-Build project included installation of monitoring and treatment wells, and design and construction of a pump and treat facility. Work also included quarterly monitoring and reporting of findings at the treatment facility.

**Dublin San Ramon Services District.** James worked on design and implementation of District's hydraulic Geographic Information System. Work included database design, field surveying, and training of operations staff. Additional experience included performing urban growth analysis, water demand projections, and hydraulic modeling of water distribution systems.

**Graniterock Company.** Mr. Pollock managed research and quality assurance testing for the Graniterock Company, a producer and distributor of concrete, asphalt, crushed aggregate, and other concrete building materials.



## CLAYTON S. CHENG, PE

### *Structural Design*

Clayton Cheng has over 10 years of structural engineering, design, and construction experience with water and wastewater treatment plants, pumping stations, tunnels, and pipelines. He is familiar with building codes, AISC, ACI 318 and ACI 350, and has extensive experience with structural engineering software such as MathCAD, SAP, STAAD, FASTFRAME, NASTRAN, SHAKE91 and ENERCALC. Clayton has engineered underground and aboveground concrete structures, masonry and metal buildings, steel structures, all required extensive foundation design, and seismic analysis.

#### Registrations, Licenses, and Certifications

Registered Civil Engineer, CA #C61508

#### Education/Training

M.S., Structural/Earthquake Engineering, University of Los Angeles

B.S., Civil Engineering, California State University, Fullerton

B.S., Civil Engineering, National Taipei University of Technology

#### REPRESENTATIVE PROJECT EXPERIENCE

**Wastewater Treatment Plant Phase III Expansion, City of Patterson.** Clayton is currently leading the structural design for the next phase of expansion at the City of Patterson's wastewater treatment plant. The project consists of adding an oxidation ditch, clarifier, partial flow tertiary filter, a solids dewatering facility, and various miscellaneous site structures.

**Wastewater Treatment Plant Phase II Expansion, City of Patterson.** Mr. Cheng was structural Engineer responsible for the design of an \$11 million plant expansion consisting of headworks, screen structure, aeration basins, secondary clarifiers, aerobic digesters, electrical building, and pump stations.

**Wastewater Treatment Plant Expansion, Valley Sanitary District, Indio.** Mr. Cheng is the project structural design Engineer responsible for process analysis and process unit design for a \$25 million expansion (from 8 to 13.5 mgd) project which consists of activated sludge plant expansion, hypochlorite chlorination, and new sludge thickening and dewatering facilities. Challenging geotechnical conditions due, in part, to existing abandoned facilities required designs based on large over-excavation and fill of the plant area.

**New York Creek Pump Station, El Dorado Irrigation District.** Clayton provided structural design services during construction for this large buried wetwell project. The structure was analyzed and redesigned for immediate retrofit during construction, when the placed concrete failed to reach required compressive strength.

**Chlorine Containment and Handling Facilities (CCHFs) for Skinner, Jensen, and Mills Filtration Plants, Metropolitan Water District of Southern California.** Clayton served as Project Structural Engineer for preparation of preliminary design reports and final design documents for the three water treatment plants. Each CCHF has a estimated construction cost of approximately \$13 million and contains either 90 ton chlorine rail cars or 19 ton trailers with chlorinators, evaporators, chlorine gas and solution piping, ventilation, and a chlorine scrubbing system.

**Water Filtration Plant Improvements and Rehabilitation, Metropolitan Water District of Southern California.** Mr. Cheng was Structural Engineer for preparation of preliminary design reports and final design documents for Washwater Reclamation No. 2 rehabilitation and water quality monitoring vault addition at the Skinner Plant.

**Water Reclamation Plant No. 4, Thermal, Coachella Valley Water District.** Clayton was Structural Engineer for the design of a \$15 million plant expansion project, which included 3





mgd activated sludge secondary, 10 mgd chlorination and dechlorination facilities, gravity belt sludge thickening, belt press sludge dewatering, sludge loading facilities.

**City of Riverside Water Pollution Control Facility, Riverside.** Mr. Cheng served as Structural Engineer for aeration basin upgrade and septage receiving facility.

**Chiquita Water Reclamation Plant Expansion, Santa Margarita Water District, Las Flores.** Clayton was the lead Structural Engineer for secondary clarifiers, aerated grit chambers, flow diversion/distribution structures, vector receiving station, and chemical storage building for a plant expansion project.

**San Luis Rey Wastewater Treatment Plant Expansion, City of Oceanside.** Mr. Cheng was Structural Engineer for new bar screen building, secondary clarifiers, RAS pump station, effluent pumping station, sludge thickener building, anaerobic digesters and digester control building, and hydraulic structures.

**Irvine Lake Chlorine Facility Upgrading, Irvine Ranch Water District.** Clayton was Structural Engineer for a chlorine building with steel roof, equipment and tank pads, and miscellaneous site improvements.

**Reclamation Plant 5, Inland Empire Utilities Agency, Chino.** Mr. Cheng was Structural Engineer for aeration blower building, RAS/WAS pump station, influent pump station, primary clarifiers, sludge pump station, chemical handling facility, and operations building.

**Cater Water Treatment Plant, City of Santa Barbara.** Clayton was Structural Engineer for design of an operations annex, clearwell, retaining walls, and masonry buildings.

**East Yuma Water Reclamation Plant, Yuma.** Mr. Cheng was Structural Engineer for primary/secondary clarifiers, influent pump station, tertiary filters and filter feed pump station, and recycled water pump station.

**De Robles Plant Upgrades, City of El Paso.** Clayton was the leading structural design engineer for a circular concrete dome digester project.

**Chemical Facilities Upgrade, Southern Nevada Water Authority, Las Vegas.** Mr. Cheng was the structural design engineer for this project which included sample/ammonia vaults, masonry wall with steel joists warehouse building, and rectangular cast in place concrete liquid storage tanks.

**Rattlesnake Reservoir Project, Irvine Ranch Water District.** Clayton completed structural design of upgrades to a masonry chlorine disinfection facility.

**Sheffield Reservoir Project, City of Santa Barbara.** Mr. Cheng was the structural engineer for a buried cast-in-place concrete vault appurtenant to the Sheffield Reservoir.

**Digester Expansion, City of Petaluma.** Clayton was Structural Engineer for design of circular dome anaerobic sludge digesters.

**Perris Water Treatment and Water Reclamation Plants Eastern Municipal Water District, Perris.** Mr. Cheng was Structural Engineer for microfiltration, chlorine contact tanks, and effluent pump station.

**Clark County Wastewater Treatment Plant, Las Vegas.** Clayton was Structural Engineer for this major project which included addition of aeration basins, RAS/WAS pump station, flow distribution structures, grit/screen building, soil biofilter fan area building, and ferric chloride building. Structures included concrete and reinforced masonry construction.

**El Estero Wastewater Treatment Plant Upgrades, City of Santa Barbara.** Mr. Cheng was the structural design engineer for a slender wall concrete building design.

**Reclamation Plants 1 and 4, Inland Empire Utility Agency.** Clayton was lead structural design engineer for design of structural retrofits at both plants.