STEVEN R. ANDREWS, P.E.

EDUCATION:

B.S., Environmental Engineering, Pennsylvania State University

PROFESSIONAL DATA:

Registered Professional Engineer, States of California and Pennsylvania

EXPERIENCE: Thirty-four years experience in planning, design and construction of wastewater treatment plants, wastewater reclamation plants and pump stations, wastewater lift stations, force mains, and gravity sewers, water pipelines, water storage reservoirs; preparation of master plans for utility service for large proposed and existing developments and cities; preparation of wastewater facilities plans and feasibility studies.

Principal Engineer for Camarillo Sanitary District's Village at the Park Sewer Lift Station in Camarillo, CA. The project included preparation of design plans and specifications for the three submersible sewage pumps, piping, valving, metering, odor control, MCC, standby engine generator, wetwell, electrical, telemetry and controls for a new development within the District. The total construction cost was $985,000.

Principal Engineer for City of Chino Hills' Pine Valley Estates Sewer Lift Station in Chino Hills, CA. This ongoing project included preparation of design plans and specifications for a 35 foot deep precast wet well and two submersible sewage pumps, piping, valving, metering, odor control, MCC, standby engine generator, electrical, telemetry and controls for a new development within the City. The total construction cost is $1.9 million.

District Engineer for Trabuco Canyon Water District responsible for facilities planning, facilities evaluation studies, preparing plans and specifications and general district engineering support. The District operates domestic water, wastewater and reclaimed water systems. The District facilities include a water filtration plant, a wastewater reclamation plant, a multiple pressure zone domestic water system, several domestic water pump stations and reservoirs, a wastewater collection system, several sewage lift stations and a reclaimed water system.

Project Manager for the Veeh Sewage Lift Station Modification for El Toro Water District (El Toro, California). The design involved the replacement of two 400 gpm submersible pumps with two 800 gpm pumps along with the installation of an emergency generator, new control and electrical equipment, piping vaults, and site work.

Project Engineer for design of 8.5 mgd return activated sludge pump station at the Laguna Hills Sanitation wastewater Reclamation Plant (El Toro, California). The design involved construction of five 1,200 gpm non-clog sewage pumps with variable speed drive, four (4) flow and density meters, piping, controls and electrical equipment. The station was retrofitted during an upgrading phase at the treatment plant.

Project Manager responsible for the Orange County Water District Green Acres Tertiary Treatment Facilities Chlorine Contact Chamber Expansion Project. Project included expanding the capacity of the existing chlorine contact chamber from 7.0 MGD to 12.7 MGD. The expansion included the installation of a deep well supply system. The deep well supply system includes a metering valve diffusion system. The installation of a complete sodium hypochlorite system to replace the existing chlorine gas system. The sodium hypochlorite system includes an 8,300 gallon double containment storage tank and (2) 20 gpm metering pumps.

Project Engineer responsible for preparing plans and specifications for upgrading El Toro Water District wastewater treatment plant from 2.5 mgd to 6.0 mgd. Plans included installation of new headworks, rotostrainers, modifications to existing aeration ponds, new RAS pumping, new circular secondary clarifiers, sludge handling facilities, intertie with AWMA pump station, electrical and control modifications. Also provided services during construction and start-up.

Project Engineer responsible for preparing plans and specifications for design of the 3.2 mgd wastewater reclamation plant at the California Men's Colony, San Luis Obispo, which met Title 22 requirements. Project included design of headworks, pretreatment, primary treatment, secondary clarification, phosphorus removal, tertiary filtration system which included multi-cell filtration unit with capability of auto regeneration; surface scour and automatic removal of emulsified grease and oils, backwash system including pumps and storage tank and clear water pumping system.

Project Manager for study, design and construction inspection of modifications to MCA Development (Universal City, California) potable and storm water and wastewater system. Responsible for design of 8- to 16-inch water mains totaling 15,000 feet in length, a 7,000 gallon hydro-pneumatic tank to retrofit to existing 700 gpm station, and 6,000 feet of sanitary sewers and storm drains.

Project Manager for the El Toro Water District Wastewater Reclamation Plant Upgrade design. The design involved preparing plans and specifications for a 4.0 mgd tertiary treatment system including 90 minute detention chlorine contact basin and chlorine building with 8 2-ton cylinders, reclaimed water pump station utilizing variable frequency drives and filtration system. The system was designed to obtain secondary effluent from the ETWD wastewater plant and treat to meet requirements of Title 22 for providing reclaimed water to the 27 hole Leisure World golf course.

Project Manager for many wastewater and water pump station preliminary and final designs, both new construction and upgrading, including El Toro Water District Station's Veeh, Alscot, Westline, Oso, Cherry, Shenandoah, P-1, P-3, P-4, Towers, Sosiega, Elkins and Viejo pump stations; Irvine Ranch Water District Portola Hills Pump Station; Orange County Water District's Santiago Creek Pump Station; and Moulton Niguel Water District's Rancho Pump Station. These stations varied in capacity from 200 cfs to 1 cfs.

Principal Engineer for the study and design of new 0.6 mgd wastewater reclamation plant for the proposed 4-S Ranch development. The impact of land disposal of wastewater relative to California Regional Water Quality Control Board's Basin Plan water quality standards was determined. Geologic evaluation including soil logs were completed and included within the report. To reduce the TDS and nitrate levels of the wastewater, a low pressure reverse osmosis process was recommended. An engineering economic analysis was conducted and utilized for selection of recommended plan. design plans and specifications were prepares including headworks, aerated grit chamber, flow meter, clarifiers and activated sludge aeration system, sludge drying beds, RAS pump station, equalization basin, tertiary filters and reverse osmosis system, control building, and effluent spray irrigation system.

Project Manager for wastewater treatment plant upgrades for the County of Orange Joplin Youth Center and Los Pinos Forestry Camp facilities. The Joplin Youth Center project involves evaluation of the existing package treatment system, preparation of plans and specifications for a new package activated sludge treatment facility including headworks, extended aeration system including clarification, construction engineering services and interface with the California Regional Water Quality Control Board to revise the waste discharge permit. The Los Pinos Forestry Camp project involves evaluation of the existing new facultative pond treatment system, recommendations of operational improvements and interface with the California Regional Water Quality Control Board to revise the waste discharge permit.

Project Engineer responsible for Green Acres Reclamation Study. Study investigated feasibility of water reclamation program to serve greenbelt areas adjacent to Orange County Water District's Water Factory 21. Prepared preliminary design for upgrading Water Factory 21 including tertiary filters, chlorination, pumping station and distribution system. Reviewed criteria with Department of Health Services, Berkeley to ensure compliance with Title 22 requirements. Developed phased program of pumping, transmission mains, treatment modifications and users' on-site modifications. Analyzed different hydraulic conditions to determine optimum sizing of reclaimed water transmission mains.

Project Manager responsible for construction administration of the California Department of Water Resources' 1.0 mgd Los Banos Demonstration Desalting Facility in Los Banos, California. Responsibilities included review of all shop drawings, preparation of notice of changes, clarification of plans and specifications, coordination with DWR field personnel, preparation of construction review report, and review of reverse osmosis unit acceptance testing, preparation of as-built drawings and Operations and Maintenance Manual.

Project Manager for preparation of plans and specifications for a 1.0 mgd agricultural wastewater desalting treatment plant for California Department of Water Resources in Los Banos, California. Pilot facility will serve as prototype for a series of 10 to 16 plants of

up to 25 mgd each. Plant is a tertiary treatment plant for biologically treated agricultural wastewater. The design included a reactor clarifier, dual and deep bed media filters, ion exchange and 3-stage reverse osmosis desalting system.

Project Manager for the Ft. Irwin, California Rehabilitation of Wastewater Treatment Plant. The rehabilitation conducted for the Army Corps of Engineers, Sacramento Division, involved various projects including upgrading the pretreatment process of the wastewater treatment plant, the addition of a new reclaimed water disposal system, expanding the aerated lagoon system, addition of chlorine contact tanks and chlorine building, expanding the sludge drying beds, modifying the sludge pumping system, and replacing the anaerobic digester cover and controls.

Project Manager for the design of a wastewater reclamation plant for the Fort Irwin National Training Center, Ft. Irwin, California. The design included preparing plans and specifications, coordination with the developer, California Regional Water Quality Control Board, and the Army Corps of Engineers. SAE also provided engineering support during bidding and construction.

Project Manager responsible for the Orange County Water District's (Fountain Valley, California) "Development of Improvement Program for Santiago Creek Basins". This pre-design study and report involved the investigation of alternatives to divert surface water from the Santa Ana River to the Santiago Creek Basins for recharging the groundwater basin. Various sized pump stations and pipelines were analyzed to determine the most efficient system to transfer water. The project included a detailed hydrologic study of the Santa Ana River and geotechnical investigation of the existing Santiago Creek Basins for slope stabilization and other improvements. Preliminary plans for the 200 cfs pumping station, 24,000 feet 66-inch pipe and basin improvements (including flood control structures) were prepared. Total estimated construction cost was $20M.

Project Engineer for study and design of 1.0 mgd wastewater treatment plant for City of Pigeon Creek, Pennsylvania. A contact stabilization activated sludge treatment process was selected and designed. Included in the design were 14,500 feet of 8- to 15-inch VCP sanitary sewer.

Project Manager responsible for preparation of water system master plans for the El Toro Water District, Rancho Matilija (Ojai, California), Fontana Special Area Plan, City of Pismo Beach, and Orange County Water Districts' Green Acres Predesign Study. All studies included hydraulic network analysis involving computer modeling technique, engineering economic analysis and development of an implementation plan. Some studies also included preparation of wastewater planning study.

Project Engineer responsible for start-up of Advanced Wastewater Treatment (AWT) pilot plant (20 gpm) for the government of Hong Kong. Primarily responsible for stabilizing operation of nitrification-denitrification process in providing supervision to Hong Kong engineers on all phases of AWT plant. Waters to be treated include secondary effluent and polluted river water. Other processes included in pilot plant are flocculation media filtration, chlorination, ozonation and granular activated carbon filtration. Also involves with reviewing analytical testing program for obtaining data for final engineering report.

Project Engineer for the design of various wastewater lift stations, force mains, and sewer lines for Titusville and Linesville, Pennsylvania.

EMPLOYMENT HISTORY:

1989 to Present	President, Steven Andrews Engineering
1985 to 1989	Founding Principal, IWA Engineers
1979 to 1985	Project Manager, PRC Engineering, Inc.
1978 to 1979	Sanitary Engineer, Hunt-Wesson Foods
1974 to 1978	Project Engineer, The Chester Engineers