Lydia Holmes

Education

MS Environmental Engineering, University of California, Davis, 1995

BS Civil Engineering, University of California, Davis, 1992

Licenses

Civil Engineer, California

Professional Affiliations

American Society of Civil Engineers

Society of Wetland Scientists

WateReuse Association of California

Ms. Holmes' experience includes a variety of projects including the following:

- Assistant project manager for the development of a 30-year wastewater master plan for the City and County of San Francisco as a joint venture with Brown and Caldwell and Metcalf and Eddy. Carollo is providing the project management for the master plan, which includes providing the overall direction of work, coordinating the other joint venture members and subconsultants, preparing materials for presentations to the San Francisco Public Utilities Commission, facilitating team brainstorming workshops, and developing evaluation criteria to screen and compare alternatives. The master plan project includes condition assessments of existing wastewater treatment facilities and major pump stations to identify those facilities that will need replacement during the planning horizon, future regulatory requirements for bay and ocean discharges, projection of sea level rise, evaluation of low impact development, involvement with stakeholders, and a financial analysis and plan.

- Project engineer for a water quality impacts assessment for the Carmel Area Wastewater District (CAWD), in Carmel, California. Evaluated change in water quality from the discharge to Carmel Bay from producing recycled water with microfiltration/reverse osmosis and discharging reject through existing outfall. Met with Central Coast RWQCB to discuss results and NPDES permit implications.

- Engineer for the City of Morro Bay, California, Cayucos Sanitary District/City of Morro Bay Comprehensive Recycled Water Study. Developed alternatives for implementing a recycled water program, including pipe routing and sizing. Conducted a plant evaluation and recommended facilities needed to produce recycled water. Developed costs for facility improvements, transmission, and storage requirements.

- Assistant project manager for the City of Davis, California, Wastewater Strategic Master Plan. The plan considers alternate discharge locations, including reuse, changes in regulations, and alternative treatment trains to meet regulatory scenarios. Process performance and capacity of existing plant evaluated. Existing treatment processes include: primary clarifiers, oxidation ponds, aerated ponds, lemna ponds, overland flow, wetlands, digesters and sludge lagoons.

- Performed process modeling for new wastewater treatment projects and expansions including, an oxidation ditch system for the Discovery Bay wastewater treatment plant expansion and the California Men's Colony at San Luis Obispo, nitrification activated sludge for the City of Turlock, California, wastewater treatment plant expansion, and plant expansion alternatives such as ponds, trickling filters, and activated sludge at the City of Stockton, California, wastewater treatment plant.

- Project engineer for City of Stockton, California, Regional Wastewater Control Facility Master Plan. Responsible for detailed evaluations and projection of plant flows and loads for planning future facilities. Analyzed existing plant capacity including use of detailed primary clarifier performance model. Screened 60 alternatives for compliance with river dissolved oxygen requirements and ammonia reduction requirements down to 20 viable options. Screening process included a large public involvement program with over 50 stakeholders. Alternatives included treatment (convention and non-conventional, i.e., wetlands) options, zero discharge through reuse or groundwater recharge, and river management options such as aerating the river to improve dissolved oxygen levels. Performed detailed evaluation of 20 viable alternatives including future facilities sizing and need based on use of a plant model. Developed capital, operation, and maintenance costs for the 20 alternatives as well as determined non-economic

considerations for each alternative. Six viable alternatives remained and were further developed for evaluation in a programmatic EIR.

• Lead engineer for the City of Fresno, California, Fresno-Clovis Regional Wastewater Reclamation Facilities Master Plan. Responsible for compilation and evaluation of historical treatment plant performance, projection of future flows and loads for planning future facilities, and setting up a solids balance model used to project future sludge production. Evaluated existing facilities capacity, determined design and standby criteria, evaluated future facilities needs, and determined layout of future facilities. Performed a potential reuse market assessment in the Fresno, California area. Alternatives included community-based irrigation and industrial water reuse, groundwater recharge, and agricultural irrigation including supplying recycled water to irrigation districts. Performed a financial analysis of projected costs for the identified master plan projects and yearly expenditures associated with future expansions. This financial analysis developed anticipated sewer service charges and connections.

• Project engineer for a planning study for the City of Petaluma, California, Water Recycling Facility Project. Responsible for developing alternatives for new treatment facilities to replace the City's 1938 wastewater treatment plant. The new facilities will produce California Title 22 unrestricted use quality water. Alternatives evaluated include advanced facultative ponds, aerated lagoons, primary clarifiers followed by oxidation ponds, activated sludge, and extended aeration. Process modeling for each alternative determined sizing. Each alternative also considered dissolved air flotation versus vegetated wetlands for algae removal.

• Project engineer for a study on nitrification treatment alternatives for the City of Stockton, California. Evaluated alternatives to meet discharge limits of HN3 < 2 mg/L. Alternatives evaluated included nitrifying activated sludge, nitrifying trickling filters, and biological aerated filter (BAF). Impacts of continuing to use oxidation ponds versus abandoning the ponds were considered. A separate metals study was performed as part of the work which determined that the ponds significantly reduce effluent metals concentrations.

• Engineer responsible for developing alternatives for wetlands and effluent storage for the City of Roseville, California, Pleasant Grove Wastewater Treatment Facilities Project. Coordinated work with hydrologic subconsultant to evaluate flooding on the creek and required effluent storage on-site. Developed options for using effluent storage basin as treatment wetlands, environmental enhancement wetlands, and wetlands mitigation bank. Responsible for evaluating wetlands ability to reduce effluent metals for meeting discharge requirements.

• Project engineer for evaluation of filtration and disinfection alternatives for Sacramento Regional Wastewater Treatment Plant (SRWTP) Master Plan. Conducted pilot study of sand filtration, disk (cloth) filtration, and microfiltration upstream of UV. Pilot testing included conventional parameters as well as persistent pathogens and metals. Developed costs for implementing filtration/UV at SRWTP. Evaluated non-economic factors such as ability to meet future regulatory requirements.

• Lead engineer for predesign of the City of Petaluma, California, Water Recycling Facility Project. Responsible for process model used to size all facilities. Developed water balance used to compare storage in ponds with various reuse and discharge scenarios. Responsible for evaluation of facilities for removal of algae including use of wetlands and use of dissolved air flotation (DAF). Responsible for coordinating with environmental subconsultant for development of EIR. Reviewed water quality data to determine potential effects to receiving stream and to downstream wetlands. Coordinated with regulatory agencies for development of NPDES permit for discharge.

• Project engineer for sustainability analysis for the City of Petaluma's Water Recycling Facility. Evaluated treatment alternatives for sustainability using the Natural Step and Ecological Footprint calculations. The Ecological Footprint measures the amount of bioproductive space required to produce all the materials and energy consumed, and to sequester or absorb all wastes produced, for a given activity. The City Council used the ecological footprints of each alternative to make the final selection of the preferred alternative.

• Project engineer for sustainability analysis for King County's new reclaimed water production

facility in the Sammamish Valley. Performed Ecological Footprint calculations to determine if the new facility increases sustainability for the Sammamish Valley. The calculations included determining impacts of decreased groundwater pumping on the Sammamish river and consequently the beneficial impacts to endangered salmon, decrease of fertilizer use due to nutrients in the recycled water, and the benefit of supporting and maintaining agricultural land in production.

- Engineer for permitting tasks for the City of Roseville, California, Pleasant Grove Wastewater Treatment Facilities Project. Responsibilities include obtaining NPDES renewal for the City's Dry Creek Wastewater Treatment Plant, which required meeting with the Central Valley Regional Water Quality Control Board to discuss issues including appropriate receiving water limits (pH, Dissolved Oxygen, temperature) for a cold water fisheries creek versus a warm water fisheries creek.

Publications/Presentations

Holmes, L., Ban, M., Fox, T.P., Hagstrom, J.P., and Stutz-McDonald, S.E. "Implementing Sustainability in Water Recycling." Paper presented at the Water Environment Federation 76th Annual Technical Conference & Exposition, New Orleans, LA, October 2-6, 2004.

Holmes, L., Ban, M., Wing, D.W., and Stutz-McDonald, S.E. "The Creation of a 'Wetlands Park' Gains Public Support of a Recycling Facility and Secures Grant Funding." Paper presented at the Water Environment Federation 76th Annual Technical Conference & Exposition, New Orleans, LA, October 2-6, 2004.

Hansel, M. and Holmes, L. "What's An Engineer to Do? Incorporating Sustainability into Planning a Wastewater Treatment Facility." Paper presented at the Life Cycle Assessment & Life Cycle Management InLCA/LCM 2003 Conference, Seattle, WA, September 22-25, 2003.

Holmes, L. "Sustainability in the Sammamish Valley - Is Water Reuse Sustainable?" Paper presented at the Pacific Northwest Clean Water Association 70th Annual Conference, Boise, ID, September 14-17, 2003.

Eaton, C.L., Holmes, L., and Ban, M. "Lessons from a Tree - Incorporating Sustainability into the Planning and Design of a Wastewater Treatment Facility." Paper presented at the Pacific Northwest Clean Water Association 2002 Annual Conference, Yakima, WA, October 20-22, 2002.

Sethi, S., Juby, G.J.G., Schuler, P.J., and Holmes, L. "Microbial Removal Using Microfiltration for Direct Discharge and Reuse Applications. Paper presented at the California Water Environment Association 2002 Annual Conference, Sacramento, CA, April 2-5, 2002.

Sethi, S., Juby, G.J.G., Schuler, P., and Holmes, L. "Evaluation of Microfiltration for Microbial Removal in Reuse Applications: Performance Assessment from Three Pilot Studies." Paper presented at the American Water Works Association 2001 Annual Conference & Exposition, Washington, D.C., June 17-21, 2001.

Holmes, L., Williams, C.R., Narayanan, B., Juby, G.J.G., and McDonald, H.S. "Side-by-Side Comparison of Membrane and Conventional Filtration Technologies with UV Disinfection to Meet Existing and Future Regulations." Paper presented at the Water Environment Federation Technical Conference & Exposition, Anaheim, CA, October 14-18, 2000.

Holmes, L., Bun, M. "Sustainability as a Criteria for Planning a Water Recycling Facility." Presentation at WateReuse Association Conference, Napa, CA, September 12-15, 2000.

Williams, C.R., Holmes, L., Narayanan, B., Juby, G.J.G., and Loge, F. "Granular Media, Cloth Filters, and Microfiltration As Pretreatment for UV Disinfection of Secondary Effluent." Paper presented at the California Water Environment Association 2000 Spring Annual Conference, Sacramento, CA, April 16-19, 2000.

Bachand, P.A.M., McGovern, P., Holmes, L, and O'Brien, A. "The Viability of Constructed Wetlands to Meet the National Toxics Rule for Toxic Elements (Cd, Hg, Pb, Zn, Cu)." Poster presented at the Water Environment Federation Technical Conference & Exposition, Anaheim, CA, October 9-13, 2000, and at Water Environment Federation, Atlanta, GA, October 9-13, 1999.