

June 8, 2020

San Mateo County Planning Commission  
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[mschaller@smcgov.org](mailto:mschaller@smcgov.org)

**RE: MidPen Housing Cypress Point Housing Project, Moss Beach CA  
Wastewater Impact Analysis**

Dear Commissioners Hansson, Gupta, Santacruz, Ramirez and Ketcham,

I write regarding the Wastewater Impact Analysis for the proposed MidPen Cypress Point project.

I am a registered Civil Engineer (State of California License No. 58914) experienced in wastewater treatment and disposal. I received my Ph.D. in Civil and Environmental Engineering from the University of California at Davis in 1999 where I majored in wastewater treatment with doctoral minors in ecology and stochastic modeling. I have taught wastewater treatment process design courses for the State Water Resources Control Board and owned a 150-person engineering firm specializing in municipal infrastructure permitting, planning, design, and operation (ECO:LOGIC Engineering, Roseville, CA) prior to its sale to Stantec in 2011. My CV is attached.

To prepare these comments I reviewed the following documents:

- Cypress Point Project MidPen Housing, Public Services and Utilities (Stevens Consulting, July 2018)
- Cypress Point Project Cumulative Impacts Analysis (2<sup>nd</sup> County Review Draft, April 2019)
- Cypress Point Project Preliminary Environmental Evaluation Report (2<sup>nd</sup> County Review Draft, April 2019)
- Carollo Engineers (1999) Sewer Authority Mid-Coastside Wet Weather Flow Management Program Facility Plan Report DRAFT
- Sewer Authority Mid-Coastside Infrastructure Plan: FY17/18 –FY21/22
- Sewer Authority Mid Coastside (April, 2018) DRAFT 20-Year Capitol Improvement Plan
- Consent Judgment, *Ecological Rights Foundation v. Sewer Authority Mid-Coastside*, Northern District of California Case No. 3:18-CV-04413
- San Mateo County Local Coastal Plan, Table 2.3, 2.4 & 2.7, Estimate Of Midcoast Sewage Generation

Based on my review of the above documents and my background and experience, I offer my professional opinion on the following three issues: (1) the current condition of the wastewater conveyance system to transport sewage generated by MidPen's project to the Sewer Authority Mid-Coastside (SAM) wastewater treatment facility and the history of sewage spills, (2) the potential adverse impacts from construction of the new sewage collection system



for the proposed MidPen development, and (3) the completeness of MidPen's assessment of project-specific and cumulative wastewater impacts.

### **Existing Conveyance System & History of Sewage Spills**

As background, I understand that the SAM operates an Intertie Pipeline System (IPS) for conveying wastewater from its member agencies to the SAM wastewater treatment plant. The IPS consists of pump stations, force mains (i.e., pipelines operating under pressure), and gravity flow pipelines. The totality of these systems must operate in a manner that does not allow sewage to overflow into homes, onto streets, or into waters of the United States. Any sewage that overflows the sewerage collection and conveyance system is unlawful and is called a sanitary sewer overflow (SSO).

The proposed MidPen development is located within the Montara Water & Sanitary District (MWSD), which is located at the furthest end of the IPS from the SAM wastewater treatment plant. All of the Montara sewage is pumped through the IPS by SAM's northern pump station, the Montara Pump Station, to the sewage treatment plant located in Half Moon Bay (MWSD 2018). Wastewater generated by the proposed MidPen project must necessarily be conveyed by the IPS through segments also serving Montara, Princeton by the Sea, El Granada, and the City of Half Moon Bay. SAM's Intertie Pipeline System has had at least 65 separate discharges of inadequately treated or raw sewage since 2013 alone. Over 557,103 gallons of sewage have been illegally released, the vast majority of it released into the Pacific Ocean and Half Moon Bay. In addition, SAM's operation of the wastewater sewage collection systems has resulted in tens of thousands of gallons of raw or inadequately treated sewage being released onto streets in residential neighborhoods. Sewage contains human waste, viruses, protozoa, mold spores, bacteria, and chemical contaminants. Many of the pollutants found in raw and/or inadequately treated sewage are acutely toxic.

The inadequacy of the wastewater sewage collection system and the serious ecological problems resulting therefrom have been known to SAM for decades. As far back as 1999 SAM's consultants recognized that the IPS had not been maintained in a manner to prevent regular occurrences of SSOs.<sup>1</sup> During wet weather, the IPS receives its highest flows owing to Inflow and Infiltration (I/I) (i.e., surface runoff and water from saturated soil that enters the IPS through system defects such as cracked pipes, separated pipe joints, and illegal cross connections to roof and yard drains).

About 18 years after the need for improvements was first identified by Carollo Engineers, SAM prepared an Infrastructure Plan to work toward eliminating SSOs.<sup>2</sup> That plan has not been followed in its entirety. I understand that litigation regarding the SAM system ultimately resulted in a Consent Decree being issued in 2019.<sup>3</sup> Pertinent elements of the

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<sup>1</sup> Carollo Engineers (1999) Sewer Authority Mid-Coastside Wet Weather Flow Management Program Facility Plan Report DRAFT

<sup>2</sup> Sewer Authority Mid-Coastside Infrastructure Plan: FY17/18 –FY21/22

<sup>3</sup> *Ecological Rights Foundation v. Sewer Authority Mid-Coastside*, Case No. 3:18-CV-04413



Consent Decree include completing the replacement of Granada Force Main Segment 4 by June 30, 2020, implementing the feasible recommendations of a Princeton Force Main condition assessment and pump station feasibility study by June 30, 2024, and completing replacement of the Montara Force Main by June 30, 2024 to prevent SSOs. Therefore, the system used to accommodate the proposed MidPen Cypress Point wastewater will not be able to guarantee compliance with Regional Water Quality Control Board regulatory requirements associated with SSOs until June 30, 2024 at the earliest.

Additionally, a draft Capitol Improvement Plan was issued as recently as April 2018 describing maintenance and upgrades needed through 2038.<sup>4</sup> The Capitol Improvement Plan describes Category 1 improvements (i.e., items requiring attention to address full regulatory compliance) and Category 2 improvements (i.e., maintenance items for existing infrastructure to assure compliant operation). Not all of these designated Category 1 and Category 2 improvements have been completed per the plan.

Given the above, an adequate analysis of MidPen's wastewater impacts must include evaluation of potential project impacts in light of this history of sewage spills, the SAM Infrastructure Plan, the Force Main segment replacements and Pump Station noted above, as well as the status of each program element described within the Capitol Improvement Plan.

That analysis has not been completed or released to the public to date, and thus there is an insufficient basis to assess whether there is adequate capacity to serve existing commitments with the addition of the proposed MidPen development, or cumulative development.

### **New Conveyance System & Potential for Adverse Impacts**

The Cypress Point Project Public Services and Utilities Analysis (Stevens Consulting, July 2018) conclusion - that there will be a less than significant sewer services impact<sup>5</sup> - suffers from a number of inadequacies and omissions. First, "no utility plans have been completed for the proposed project." Therefore, what actually is proposed is not adequately described. Steven's Consulting does reveal that there is no existing sanitary sewer infrastructure on the project site, and new sewer pipelines will be needed to connect the project site with the existing MWSD sewer lines in adjacent roadways. Further, while MidPen vaguely acknowledges that "MWSD transmission facilities" may need to be upgraded in the vicinity of the project site," specific sanitary sewer infrastructure plans should be provided for review prior to making a determination that the project has a less than significant wastewater impact.

Second, it is reasonably likely that a pump station will be needed for the project and if improperly designed could result in spills of sewage to waters of the United States. At its closest point, the project site is located about 750 feet from the coastline of the Pacific Ocean. Elevations of the project site range from 77 feet at the northwest corner to 189 feet along the

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<sup>4</sup> Sewer Authority Mid Coastside (April, 2018) DRAFT 20-Year Capitol Improvement Plan

<sup>5</sup> Cypress Point Project MidPen Housing (July, 2018) Public Services and Utilities



easterly boundary. A perennial stream (Montara Creek) is located approximately 50 to 250 feet to the northwest of the project site and runs parallel to the northern border prior to reaching the Pacific Ocean. There is a 100 foot elevation change moving away from the Pacific Ocean and a stream at the northern boundary. Given this geography and in the absence of utility plans, it is reasonably likely that a new pump station will be required to adequately remove wastewater from the MidPen project site to a neighboring sewerage conveyance system. Pump stations have the potential to overflow into waters of the United States if not adequately designed and maintained. Thus, there is a potentially significant adverse wastewater impact that should be evaluated further before project approval.

### **Assessment of Treatment Facility Capacity and Pollutant Loads**

Stevens Consulting Wastewater Analysis (July 2018) claims that the SAM wastewater treatment system and IPS has adequate capacity for growth anticipated in the region - based entirely on "[c]onsidering dry weather flows." It appears that MidPen has not evaluated capacity with wet weather flows. Average Dry Weather Flow (ADWF) is a regularly used term with regards to regulating wastewater treatment facilities, but it has essentially no basis in assessing adequate design and operation of wastewater treatment facilities.<sup>6</sup> Important wastewater treatment facility design parameters must account for both wet weather flows and peak pollutant loads. It appears that MidPen has not evaluated either peak wet weather flows or pollutant loads.

The most critical flow parameter in assessing adequate capacity is instantaneous peak flow, because that parameter determines whether there will be spills or overflows within the conveyance or treatment facilities, as well as adequate disinfection. As described above, the sewage collection system is currently unable to fully handle peak I/I flows without occasional SSOs.

Loads constitute the pollutants present in wastewater and are the basis of regulating the discharge. Although there has been discussion regarding a decrease in flows owing to water conservation, MidPen has not evaluated potentially significant impacts related to pollutant loads.

It is misleading to suggest in the planning documents that because water conservation has reduced flows to the wastewater treatment facility that there necessarily remains adequate treatment capacity. Water is simply a carrier for the pollutant loads. It is instructive to note that if the amount of water discharged by residences is halved owing to water conservation, it does not free up capacity that can be used by others. Rather, the concentration of pollutants in the water will instead double (i.e., the mass of pollutants remains constant when diluted in half the amount of water). In some instances treatment processes must be modified to adapt to

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<sup>6</sup> Current treatment plant loading should instead be compared to wastewater treatment plant design criteria in lieu of the average dry weather flow presentations currently used to assess capacity.



the concurrent higher pollutant concentrations combined with lower flows. In no case is treatment capacity ever increased by reducing water volume alone.

Pollutant loads should be considered when determining whether there is adequate treatment capacity to accommodate current obligations. Two issues are entirely missing from the MidPen's analysis of wastewater impacts: (1) impacts associated with constructing accessory dwelling units (ADUs) throughout the District and (2) sludge processing and disposal needs associated with the treatment facility.

### **Accessory Dwelling Units**

Stevens Consulting reports that even without construction of the proposed MidPen project, there are already 22,000 coastal residents discharging to the wastewater treatment plant. The San Mateo Local Coastal Plan describes the need to account for 466 second units and 45 caretaker's quarters at the residential buildout served by the sewers.<sup>7</sup> In addition, the California Legislature recently approved an increase in pollutant loads to the wastewater treatment plant from existing developed sites (e.g., Assembly Bills 68, 881 and Senate Bill 13). The legislation allows for increasing the number of habitable dwellings discharging into existing wastewater treatment plants.

MidPen's wastewater analysis fails to evaluate the impact on wastewater treatment facility capacity of the proposed MidPen project in combination with the second units contemplated in the LCP and the impact of adding these additional ADUs.

Also, MidPen does not consider whether the expanded sewage line and potential pump station for the project will increase the development intensity or off-site development by facilitating such second units or ADUs in the project vicinity.

### **Analysis of Cumulative Wastewater Impacts**

The Cypress Point Cumulative Impacts Analysis (April, 2019) concludes that the Cypress Point project would make a less than cumulatively considerable contribution - based on its assumptions that "the proposed project would not require or result in the construction of new wastewater treatment facilities, or the expansion of existing treatment facilities" and that "SAM has sufficient capacity." However, as discussed above these cumulative impact conclusions are suspect given that MWSD transmission facilities may need to be upgraded in the vicinity of the project site, specific sanitary sewer infrastructure plans has not been provided, an improperly designed pump station could result in spills of sewage to waters of the United States, and to date MidPen has not evaluated either peak wet weather flows or pollutant loads from the proposed project.

The Cypress Point Cumulative Impacts Analysis (April, 2019) at Table 3 describes reasonably foreseeable residential projects. The report predicts 19 accessory dwelling units

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<sup>7</sup> San Mateo County Local Coastal Plan, Table 2.3 Estimate Of Midcoast Sewage Generation



within El Granada (10 units), Half Moon Bay (1 unit), Montara (5 units), and Moss Beach (3 units) with no units forecast for Miramar, Pacifica, and Princeton. The projection of only 19 accessory dwelling units in a system accommodating at least 22,000 coastal residents appears low and is unsubstantiated. Insofar as (1) housing is already generally scarce throughout California and the scarcity was the basis for passing the legislation, (2) the legislation results in reduced impact fees associated with constructing on already developed lots, and (3) the cost of constructing ADUs is expected to be far less than constructing residences on new lots owing to the presence of existing infrastructure, it does not appear reasonable to suggest that only 19 ADUs will be constructed within District limits. An adequate cumulative impact analysis would consider the ultimate potential for ADUs following the recently enacted legislation within existing lots and develop pollutant loading criteria accordingly when assessing how much treatment capacity remains at the wastewater treatment plant.

Sludge Production.

As stated above, MidPen's Public Services and Utilities (Stevens Consulting, July 2018) does not address pollutant loads. As stated above, pollutant loads ultimately become sludge that requires its own treatment and disposal. It is appropriate to include analysis pertaining to sludge treatment capacity and long-term sludge disposal capacity when assessing the ability of the wastewater treatment plant to treat to meet existing commitments, including those the proposed MidPen project as well as associated with likely ADUs.

Thank you for considering these project comments.

Sincerely,



Robert W. Emerick Ph.D., P.E.



# Robert W. Emerick Ph.D., P.E.

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Dr. Emerick was a principal owner of ECO:LOGIC Engineering, a 150+ person engineering firm specializing in design, permitting, operation, and management of water/wastewater infrastructure. The firm was sold to Stantec, Inc. in 2011, with Dr. Emerick leaving the firm in 2015 to aid in the redevelopment of downtown Sacramento and to work as a private engineering consultant. Dr. Emerick has 25 years of civil engineering/water quality experience, including teaching at the undergraduate and graduate level, research, engineering management, regulatory permitting, environmental studies, regulatory enforcement, and water/wastewater treatment process development, design and operation. He is an acknowledged leading expert in obtaining waste discharge permits for private and public agencies and developing treatment processes for the removal of trace contaminants from wastewater discharges.

## EDUCATION

B.S., Civil Engineering, University of California, Davis, California, 1992

M.S., Civil and Environmental Engineering, University of California, Davis, California, 1993

Ph.D., Civil and Environmental Engineering, University of California, Davis, California, 1998

University of California at Davis, California State University Sacramento

*Teaching Assistant and Adjunct Professor. Courses were aimed at (1) retraining nuclear engineers after the closure of Mare Island Naval Shipyard for civilian practice, and (2) undergraduate and graduate civil engineering education. Taught wastewater treatment design for UC Davis to aid in their accreditation process. Served on the review panel for UC Davis civil engineering accreditation.*

## REGISTRATIONS

Professional Engineer #58914, State of California

## Redevelopment

Sacramento, CA

*Owner and Engineer. Restored and recently completed redevelopment/construction of 35,000 square feet of historic commercial property for contemporary uses. Started businesses as part of the redevelopment effort, including Crest Theatre (950 seat venue for concerts, movies, community events), Empress Tavern (7500 square foot fine dining restaurant), and Mother (1500 square foot casual vegetarian restaurant).*

## PROJECT EXPERIENCE

### Teaching

State Water Resources Control Board

*Instructor (via role as Adjunct Professor at UC Davis). Responsible for wastewater process design, operation, and troubleshooting course development and presentation. This project involves a series of classes presented to all State of California regulators, fund reviewers, policy makers, and facility inspectors. Courses are intermittently on-going and include (1) Disposal of Non-Designated Waste to Land, (2) Wastewater Facility Inspection and Monitoring, (3) Introduction to Wastewater and Its Treatment, and (4) Wastewater Engineering 2 "The Advanced Class." Courses have been video recorded for archival at the State Water Resources Control Board. Courses have been translated into Spanish and have been presented to operators in Mexico.*

### Permitting, Compliance, Auditing

Facility Improvements, Lone, California

*Project Manager for developing facility improvements needed for compliance with Reclamation permit limitations associated with Castle Oaks Golf Course (Lone, CA).*

\* denotes projects completed with other firms



Lincoln, Rio Vista, Merced, Dixon, Donner Summit, Reno

*Project Manager/Engineer responsible for negotiating permits for (1) land discharge of secondary effluent for Lincoln, CA (2) land discharge of secondary effluent for Dixon, CA, (3) master reclamation permit for Lincoln, CA., (4) surface water discharge of secondary and tertiary effluent for Lincoln, CA, (5) surface water discharge of secondary and tertiary effluent for Rio Vista, CA., (6) surface water discharge of secondary and tertiary effluent for City of Merced, CA., (7) surface water discharge for Donner Summit Public Utility District, (8) aquifer storage and recovery project for Reno, NV.*

North Lake Tahoe Public Utilities District Potable

*Project Manager/Engineer responsible for negotiating a the nation's first permit and designing improvements to produce potable water on an unfiltered drinking water supply using UV disinfection technology for North Lake Tahoe Public Utilities District.*

**Research**

City of Reno, NV

*Developing a membrane/ozone/biologically active activated carbon treatment process for the removal of trace emerging contaminants of concern for a groundwater aquifer storage and recovery project.*

City of Dixon, CA

*Responsible for analyzing groundwater and effluent quality for determining the presence of and/or extent of groundwater degradation. Project involves the application of tracers for determining origin and fate of wastewater contaminants.*

Lincoln, CA and Rio Vista, CA

*Investigating the partitioning of priority pollutant contaminants and wastewater treatment process impacts on the removal/reduction of priority pollutants for Lincoln, CA and Rio Vista, CA. Developed methodology for determining the correct hardness when applying CTR metals criteria.*

Caltrans

*Investigating/developing new treatment processes for removing iron, nitrogen, phosphorous, and turbidity from stormwater for Caltrans to aid in compliance with discharge restrictions into Lake Tahoe. Project involved development, construction, and operation of pilot treatment facilities treating highway runoff in the Lake Tahoe basin.*

Sacramento Regional Wastewater Treatment Plant Coliform Bacteria Study

*Investigated the physical parameters influencing the development of coliform bacteria associated with wastewater particles. Research involved developing an oligonucleotide probe specific to the family Enteriobacterioceae for visual identification of coliform bacteria within wastewater particles.*

Sacramento Regional Wastewater Treatment Plant UV Disinfection Performance

*Investigated the impact of particle size distribution impacts on UV disinfection performance for Sacramento Regional Wastewater Treatment Plant. Research involved developing a new computer aided photographic method of determining the particle size distribution of wastewater.*

Sacramento Regional Wastewater Treatment Plant Tertiary Process Development

*Aided in the development of a pilot facility to investigate removal of trace contaminants from the discharge into the Sacramento River. Provided professional peer-review of study results.*

UV Equipment Validation Testing

*Designed and operated a pilot testing facility for approval of UV disinfection system by the State of California Department of Health for use on recycled effluents. UV disinfection systems tested include (1) the Trojan Technologies Swift 4L12 UV disinfection system, (2) the Trojan Technologies UV 3000+ UV disinfection system (3) Trojan Technologies UV 2000 disinfection system, (4) Fisher Porter UV disinfection systems, (5) WEDECO TAK55 spot check validation for City of Lincoln, CA, (6) Trojan Technologies UV 3000+ spot check validation for City of Yucaipa, CA., (7) ENAQUA low pressure high output UV disinfection system.*

Title 22 Filtration Validation Testing

*Designed and operated a pilot testing facility testing for approval of filtration systems by the State of California Department of Health for use on recycled effluents. Filtration systems tested include (1) Nordic Water Products Disc Filter, (2) Parkson Disc Filter, and (3) AMIAD Screen Filter.*



**Biological Virus Removal Within Intermittently Dosed Fixed Growth Filters**

*Academic project involved development of a biological virus degradation process for the production of unrestricted recycled water for on-site reuse (UC Davis).*

**Water Environment Research Foundation (Project 96-CTS-3) Impact of Upstream Wastewater Treatment Process Type on Downstream UV Disinfection Performance**

*Project involved determining wastewater treatment process impacts and developing a fundamental stochastic model describing the ability of UV disinfection to inactivate pathogens.*

**Water Environment Research Foundation (Project No. 91-WWD-1) Comparison of UV Irradiation to Chlorination for Achieving Optimal UV Performance**

*Project involved developing an empirical mathematical model for predicting UV disinfection performance.*

**Stormwater Management**

**State of California Department of Transportation (Caltrans) Stormwater BMP Pilot Program (Peer Reviewer)**

*This study was directed at reviewing, critiquing, and developing solutions associated with the BMP pilot research program.*

**San Francisco-Oakland Bay Bridge Storm Water Detention Basin Treatment Best Management Practice (BMP) Feasibility Study (Project Manager/ Engineer)**

*This study, for Caltrans, was directed at determining and comparing the environmental benefits derived from implementing stormwater treatment for the bridge expansion in relation to the costs related to stormwater treatment.*

**Caltrans Maximum Extent Practicable Analysis for Storm Water Detention Basins Associated with Highway Runoff (Project Manager and Project Engineer)**

*This study was directed at determining and comparing the environmental benefits associated with implementing stormwater detention basins statewide as part of all new and retrofit roadway expansions/improvements.*

**Lake Tahoe Basin New Stormwater Treatment Processes (Project Engineer)**

*The development of new stormwater treatment processes for implementation within the Lake Tahoe Basin. This pilot study investigates treatment trains to remove nutrients, iron, turbidity, and narrative toxicity for compliance with the nation's most stringent effluent limits associated with stormwater runoff.*

**Sacramento County Stormwater BMP Review Program (Project Manager)**

*This project was directed toward developing approval criteria for the selection of stormwater Best Management Practices (BMPs) for installation within Sacramento County.*

**Wastewater Treatment**

**State of Nevada Department of Environmental Protection**

*Responsible for summarizing reclamation policy and groundwater recharge policy nationwide and developing a unified reclamation policy for the State of Nevada that integrates the findings of ozonation/biological activated carbon adsorption research conducted concurrently for the City of Reno.*

**Donner Summit Public Utility District, CA**

*Responsible for permitting and process development for nutrient removal treatment process upgrades, mixing zones, and associated regulatory permitting.*

**City of Reno, NV**

*Responsible for treatment process development for removing emerging contaminants of concern to non-detectable levels as part of a groundwater aquifer storage and recovery project.*

**City of Davis, CA (Process Design Manager)**

*In charge of developing treatment and disposal options for compliance with effluent dominated stream regulatory requirements.*



City of Lincoln, Midwestern Placer Regional Sewer Project Environmental Impact Report (EIR), Lincoln, California (Process Design Manager)

*In charge of process development for a tertiary (Title 22 unrestricted reuse) wastewater treatment and reclamation facility for the City of Lincoln. This treatment facility is the first in Northern California to be designed specifically to comply with California Toxics Rule Regulatory requirements (toxic contaminant limitations) and receiving water limits related to effluent dominated streams. The treatment process consists of a headworks, nitrification/ denitrification, clarification, priority pollutant maturation ponds, dissolved air flotation algae removal, coagulation/flocculation, granular medium filtration, UV disinfection, and effluent reeration.*

City of Ceres Wastewater Treatment Plant Expansion, Ceres, California (Project Engineer)

*The design of a tertiary (Title 22 unrestricted reuse) wastewater treatment plant. This facility consisted of headworks, nitrifying oxidation ditches, clarification, coagulation/flocculation, granular medium filtration, and UV disinfection.*

Salt Accumulation Analysis, City of Ceres, California (Project Manager/Engineer)

*A salt accumulation analysis related to land discharge of effluent for Ceres, CA. This analysis consisted of developing a groundwater hydraulic model for determining long-term salt impacts to groundwater related to a proposed groundwater replenishment project.*

Priority Pollutant Characterization (Project Engineer)

*Responsible for priority pollutant characterization for (1) Brentwood, CA (2) Mountain House, CA (3) Lincoln, CA (4) Rio Vista, CA, and (5) La Contenta Golf Course.*

UV Disinfection Feasibility Study (Project Engineer)

*Responsible for determining the feasibility of applying UV disinfection to (1) Manteca, CA (2) Sacramento Regional Wastewater Treatment Plant, CA, (3) Woodland, CA, (4) Rio Vista, CA, and (5) Auburn, CA.*

## **Water Treatment**

North Lake Tahoe Public Utility District UV Disinfection System

*Process Design Manager/Engineer for a UV disinfection system on an unfiltered water supply for the North Lake Tahoe Public Utility District, CA. This UV disinfection system is the first in California to be permitted for the production of potable water, and the first nationally to be permitted for use on an unfiltered drinking water supply.*

Groundwater Desalinization Project, Sparks, Nevada

*Project Engineer responsible for analyzing the feasibility of groundwater desalinization.*

UV Disinfection System for Third World Environments

*Project Manager/Engineer for product review of a new UV disinfection system for application in Third World environments for the inactivation of Cryptosporidium and Giardia (Core Resources; Water Health UV Disinfection System).*

Pulsed Light UV Disinfection System

*Project Manager/Engineer for product review of a new pulsed light UV disinfection system for application on drinking water treatment (New Star Lasers).*

Steiger Hills, CA Master Water Plan

*Project Engineer responsible for master-planning a water supply and distribution system for Steiger Hills, CA.*



## PUBLICATIONS

- Contributing author to Potable Reuse Research Compilation: Synthesis of Findings, Water Environment and Research Foundation, 2016.
- Contributing author to Wastewater Engineering, Treatment, Disposal, Reuse. *Metcalf and Eddy, Fourth Edition*, 2010.
- Presentation. Emerick, R. W., Sundaram, V., Borroum, Y., Shumaker, S. Cost Effectiveness and Environmental Benefits of Combined Ozonation – UV System for Water Reclamation and Surface Water Discharge. *WEFTEC*, 2008.
- Presentation. Borroum, Y., Emerick, R.W., Pedri, J. Development of Site-Specific Metal Translators. *WEFTEC*, 2008.
- Presentation. Emerick, R. W., Borroum, Y., Pedri, J. Development of Protective Hardness-Based Metal Limitations. *WEFTEC*, 2006.
- Presentation. Emerick, R.W., Borroum, Y., Pedri, J. Bioassay Comparison of Similar Pilot- and Full-Scale UV Disinfection Systems. Validation of the Scale-up Relationship Recommended by the NWRI UV Disinfection Guidelines. *WEFTEC*, 2005.
- Emerick, R. W., Swift, J., Sakaji, R. Treat, Disinfect, Reuse – Part II.. *Water Environment and Technology*, Vol. 15, No. 3, 2003.
- Swift, J., Emerick, R. W., Scheible, K., Soroushian, F., Putnam, L. R., and Sakaji, R. Treat, Disinfect, Reuse. *Water Environment and Technology*, Vol. 14, No. 11, 2002.
- Loge, F. J., Emerick, R. W., Ginn, T. R., and Darby, J. L. Association of Coliform Bacteria with Wastewater Particles: Impact of Operational Parameters of the Activated Sludge Process. *Water Research*, 36(2002):41-48, 2001.
- Loge, F. J., K. Bourgeois, R. W. Emerick, and J. L. Darby. Variations in the Water Quality Parameters Influencing UV Disinfection Performance: Relative Impact of Filtration. *Journal of Environmental Engineering*, 127(9): 832-837, 2001.
- Presentation. Emerick, R.W., Soroshian, F., Tchobanoglous, G. Standardizing UV Equipment Performance Validation, Proceedings of UV 2000. A *Technical Symposium*, 2000.
- Blatchley, E. R., Emerick, R. W., Hargy, T., Hoyer, O., Hultquist, R. H., Sakaji, R. H., Scheible, O. K., Schmelling, D. C., Soroushian, F., and Tchobanoglous, G., Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse. *National Water Research Institute, American Water Works Association Research Foundation*, 2000.
- Emerick, R.W., Loge, F.J., Ginn, T., and Darby, J. Modeling the Inactivation of Coliform Bacteria Associated with Particles. *Water Environment Research*, 72:4, 432-438, 2000.
- Emerick, R. W., Manning, J., Tchobanoglous, G., and Darby, J. Impact of Bacteria and Dosing Frequency on the Removal of Virus Within Intermittently Dosed Biological Filters. *The Small Flows Journal*, 1:1, 36-41, 2000.



- Presentation. Loge, F. J., Emerick, R. W., Tchobanoglous, G., and Darby, J. Design and Optimization of Upstream Treatment Processes to Improve the Performance of Ultraviolet Disinfection Facilities at Sacramento Regional Wastewater Treatment Plant. *Publication of the Center For Environmental and Water Resources Engineering, UC Davis No. 99-1, 1999.*
- Presentation. Tchobanoglous, G., Emerick, R.W., Loge, F., and Darby, J. Recent Developments in Ultraviolet Disinfection. *United States Environmental Protection Agency 6th National Drinking Water and Wastewater Treatment Technology Transfer Workshop, 1999.*
- Presentation. Emerick, R.W., Darby, J., and Tchobanoglous, G. Impact of Bacteria and Dosing Frequency on the Removal of Virus Within Intermittently Dosed Biological Filters. *Water Reuse Foundation's Annual Water Reuse Research Conference, 1999.*
- Emerick, R. W., Loge, F. J., Thompson, D. E., and Darby, J. L. Factors Influencing UV Disinfection Performance - Part II: Association of Coliform Bacteria with Wastewater Particles. *Water Environment Research, 71:6, 1178-1187, 1999.*
- Loge, F. J., Emerick, R. W., Thompson, D. E., Nelson, D. C., and Darby, J. L. Factors Influencing UV Disinfection Performance - Part I: Light Penetration into Wastewater Particles. *Water Environment Research, 71:3, 377-381, 1999.*
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- Presentation. Emerick, R.W., Tchobanoglous, G. Secondary Effluent Compliance with Contemporary Effluent Limitations. *California Water Environment Federation Northern Regional Training Conference, 1999.*
- Presentation. Emerick, R.W., Loge, F.L., Darby, J. L., and Tchobanoglous, G., Impact of Particles with Embedded Coliform Bacteria on Ultraviolet Light Disinfection. *Water Environment Federation 71th Annual Conference and Exposition, 1998.*
- Presentation. Emerick, R.W., Loge, F.L., Darby, J. L., and Tchobanoglous, G., Proposed UV Disinfection Equipment Testing Protocol to Demonstrate Compliance with the California Reclamation Criteria. *Proceedings of the Water Reuse Annual Conference, 1998.*
- Presentation. Tchobanoglous, G., Emerick, R.W., Loge, F., and Darby, J.. *Seeing the Light, Environmental Protection, 1998.*
- Presentation. Loge, F. J., Emerick, R. W., Darby, J. L., and Tchobanoglous, G. Factors Influencing the Performance of a UV Disinfection System in Reclaimed Wastewater Effluent. *Water Reuse Annual Conference, 1998.*



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